Telstra Operations
National Customer Support

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Network Reliability Framework

Level 3 Monitoring Period

Methodology for Assessing Related Faults

Implementation: 1 November 2008

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1. PURPOSE

The purpose of this document is to define the company wide process for assessing whether a CSG fault that occurs in the eight month Level 3 monitoring period of the Network Reliability Framework (NRF) is a 'related fault'.

2. SCOPE

The scope of this document applies only to those Telstra CSG services that are subject to the NRF Level 3 monitoring period and experience a CSG fault during that period.

3. BACKGROUND

Telstra's regulatory obligations in relation to the Network Reliability Framework are set out in clauses 24 to 27 of the Carrier Licence Conditions (Telstra Corporation Limited) Declaration 1997.
Clause 27 is particularly relevant to this document in that it sets out the requirements in relation to monitoring, prevention, remediation and reporting at the CSG service level – otherwise known as Level 3 of the NRF. Levels 1 and 2 of the NRF relate to monitoring and reporting at the field service area and cable run levels respectively, and are not the subject of this document.

A CSG service is deemed to have contravened Level 3 where it experiences:

- four or more CSG faults in a rolling 60 calendar day period; or
- five or more CSG faults in a rolling 365 calendar day period.

Each of the faults that have contributed to a CSG service contravening Level 3 is classified as a 'contravention fault'.

Where a CSG service contravenes the above fault thresholds, Telstra must investigate the performance of the service and undertake what remediation is necessary to improve its reliability.

At the completion of the remediation, the service is subject to an eight month monitoring period. A CSG fault that occurs during this period is referred to as a monitoring period fault (***MP fault***). A MP fault must be reported to ACMA, together with sufficient information and Telstra's own assessment of whether the MP fault is a related fault, to allow ACMA to satisfy itself whether the MP fault is a related fault.

Where a MP fault is assessed as a related fault, Telstra is required to re-examine its previous remediation activity and to carry out what further remediation is necessary to improve the reliability of the service. The eight monitoring period re-commences at the completion of this further remediation.

4. ASSESSMENT PROCESS – OVERVIEW

4.1. Introduction

Where a CSG service experiences a MP fault, an investigation must be conducted to assess whether the MP fault is related to any of the contravention faults that required Telstra to remediate the service.

In order to determine whether a MP fault is a related fault, it is first necessary to determine whether the MP fault had:

- the same root cause;
- a similar root cause; or
- neither the same or a similar root cause;

  as any of the contravention faults.

4.2 Root causes - description

The root cause of a CSG fault is described in terms of its physical network location and is either a:

- unique network component (eg; main distribution frame, exchange line card, exchange unit of PGS, cabinet, pillar, remote unit of PGS, first socket); or a
- part of network plant (eg; a section of main, bearer or distribution cable, a joint, network radio tower, customer radio mast, underground or aerial lead-in cable).

The root cause of a fault is recorded under the *diagnosed faulty plant* column of both Telstra's NRF Level 3 Report and NRF Level 3 Monitoring Period Report.

The root cause is not to be confused with the reason why a fault occurred, of which there can be many reasons, including:

- normal 'wear and tear';
- moisture ingress;
- corrosion;
- storm/lightning damage;
- animal damage; and
- third party cable cuts.

It will often be necessary to take account of the above reasons in order to assess whether a MP fault was a related fault.

4.3 Related fault

A related fault is a MP fault that arose from:

a) the same root cause as one or more of the contravention faults and Telstra failed to address and eliminate the root cause of the MP fault during its remediation activity;

b) a similar root cause to one or more of the contravention faults, which Telstra could have reasonably been expected to address during its remediation activity; or

c) neither the same or a similar root cause to any of the contravention faults, which Telstra could have reasonably been expected to address during its remediation activity.

A MP fault that did not arise from either a, b or c is assessed as an unrelated fault.

Where Telstra does assess a MP fault as a related fault, it will include details of both the remediation action and completion date in the monthly Level 3 Monitoring Period Report. This information will fulfil Telstra's obligations under subclause 27(16) of the NRF licence condition. As a result, the monitoring period will commence again effective from the remediation completion date advised in the above report.

5. ROOT CAUSE CLASSIFICATIONS

5.1. Same root cause

A MP fault is classified as having the same root cause, where the root cause of the MP fault and one or more of the contravention faults is attributed to the same unique:

- network component; or
- part of network plant.

A MP fault is to be assessed as a related fault where it has been classified as having the same root cause as one or more of the contravention faults.

A common example is where the root cause of the MP fault and one or more of the contravention faults were caused by the same section of corroded copper cable.

An exception to this principle is where Telstra had addressed and eliminated the root cause of the MP fault during its remediation activity, but factors beyond its control caused the MP fault, for example, where:

- a corroded section of cable was replaced during remediation but a subsequent lightning event during the monitoring period damaged the replacement section of cable and caused a fault; and where
- a faulty network component was replaced during remediation and the replacement component experienced a subsequent fault during the monitoring period. In such instances, the replacement component was tested upon installation and deemed to be working within specification.

In both examples, the MP fault would be classified as having neither the same or a similar root cause as one or more of the contravention faults and is therefore to be assessed as an unrelated fault.

Further examples of the same root cause are provided in Appendix A.

5.2. Similar root cause

A MP fault is classified as having a similar root cause, where the root cause of the MP fault and one or more of the contravention faults is attributed to the same type of:

- network component; or
- network plant;

however,

- the MP fault is located at a different physical network location to each of those contravention faults with the same type of network component/plant; and
- it is reasonable to expect Telstra to have addressed the root cause of the MP fault during its remediation activity.

A MP fault is to be assessed as a related fault where it has been classified as having a similar root cause to one or more of the contravention faults.

A common example is where the root cause of one or more of the contravention faults was a section of copper distribution cable, whereas the root cause of the MP fault was

a different section of copper distribution cable, which it was reasonable to expect Telstra to have addressed during its remediation activity.

An exception to this principle is where Telstra had conducted appropriate line testing and inspection during its remediation activity and could not have reasonably been expected to address the root cause of the MP fault. In such instances, the MP fault would be classified as having neither the same or a similar root cause and is therefore to be assessed as an unrelated fault.

The concept of 'reasonableness' and what potential faults Telstra can reasonably be expected to address during its remediation activity is discussed further in section 5.4.

Further examples of a similar root cause are provided in Appendix B.

5.3 Neither the same or a similar root cause

Sections 5.1 and 5.2 set out the circumstances where a MP fault is to be classified as having the same root cause or a similar root cause, and therefore be assessed as a related fault.

However, there will be exceptions to this principle where it is identified that Telstra, during the remediation period, either addressed and eliminated the root cause of the MP fault or it was not reasonable to expect Telstra to do so. In such instances, the MP fault will be classified as having neither the same or a similar root cause.

There is also another set of circumstances where a MP fault will be classified as having neither the same or a similar root cause. This is where the root cause of the MP fault is attributed to a:

- different type of network component/network plant to each of the contravention faults; and
- it is not reasonable to expect Telstra to have addressed the root cause of the MP fault during its remediation activity.

A MP fault is to be assessed as an unrelated fault where it has been classified as having neither the same or a similar root cause to each of the contravention faults.

A common example is where the root cause of each of the contravention faults is a section of copper cable whereas the root cause of the MP fault was a faulty joint, which it was not reasonable to expect Telstra to have addressed during its remediation activity.

In the event it is determined that it was reasonable to expect Telstra to have addressed the root cause of a MP fault during its remediation activity, the MP fault is to be assessed as a related fault.

Further examples of neither the same or a similar root cause are provided in Appendix C.

5.4 Assessing whether Telstra took reasonable steps during remediation to address the root cause of a MP fault

Where a MP fault has:

- potentially a similar root cause to one or more of the contravention faults; or
- neither the same or a similar root cause[1] to each of the contravention faults;

an assessment will need to be made as to whether Telstra took reasonable steps to address the root cause of the MP fault during its remediation activity. This assessment will primarily be based upon whether the network component/network plant that caused the MP fault was subject to:

- appropriate line testing during the remediation period. Line testing typically involves end to end testing between various connection points, for example, between cabinet and pillar, and between joints; and
- appropriate line inspection during the remediation period. This typically involves a physical inspection during the remediation period of those network components and plant that are believed to be the cause of poor reliability of a CSG service.

Such assessments will also need to take account of a number of other pertinent factors, including:

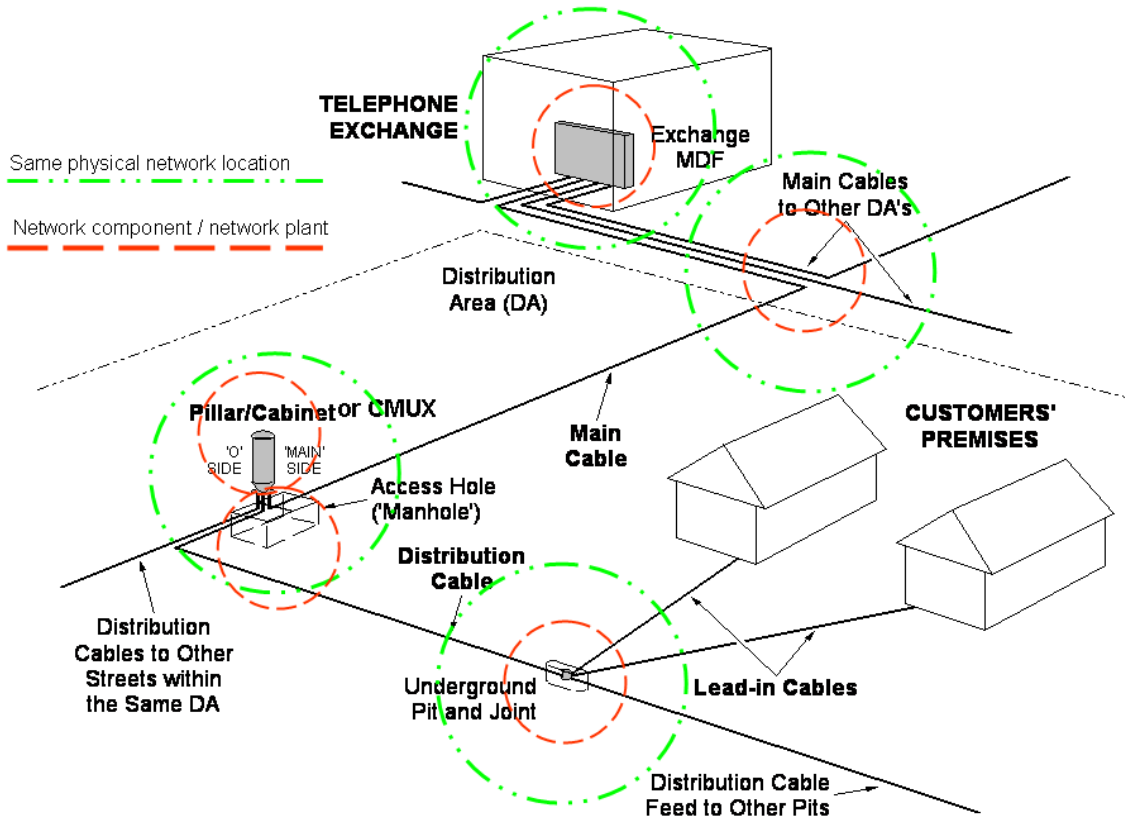
- circumstances that are clearly beyond Telstra's control, for example, damage caused to Telstra's network by extreme weather events and third party cable cuts;
- individual circumstances pertaining to a CSG service, for example, previous fault history, type of network technology and its sensitivity to weather events (ie; radio systems), distance of customer from local telephone exchange, topography, etc;
- instances where line testing/inspection is not able to detect potential defective plant. For example, a section of distribution cable may have tested within specification during end to end testing and none of the exposed connection points may have showed any symptoms of potential failure. However, the corrosion process had already commenced at the time of remediation but it was not detectable, due to the underground cable's protective sheath being perforated by lightning damage at some stage in the past; and
- instances where a joint had tested within specification during end to end testing but where a comprehensive physical inspection was not justified. Unless there is reason to believe that a joint may be subject to corrosion/water ingress, it is not Telstra's operational practice to undertake a comprehensive physical inspection as this would necessitate breaking the network seal of what is potentially a perfectly reliable joint. This in turn would require the joint to be re-sealed and tested, which is an un-justified and time consuming task.

[1] This excludes those instances, as explained in section 5.1, where it is determined that Telstra did address and eliminate the root cause of the MP fault during its remediation activity, but factors beyond its control caused the MP fault.

6. ASSESSMENT PROCESS - DETAIL

6.1 Network layout diagram for explanatory purposes

This diagrammatical representation of network layout is to be used in conjunction with the flow chart and process flow in the following sections.

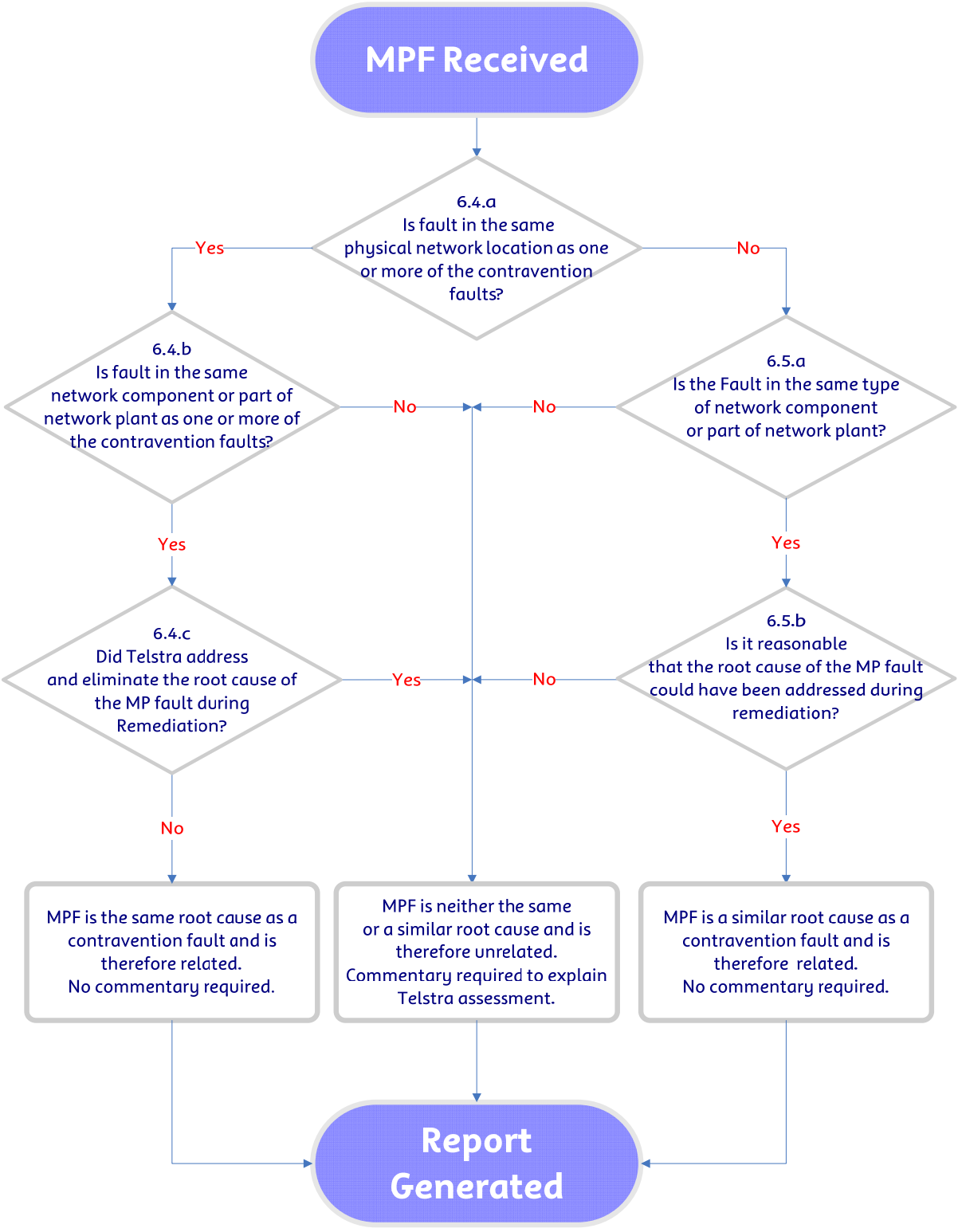


The green dotted lines in the above diagram represent those parts of Telstra's network that are in the same physical network locations.

The red dotted line represents those unique network components and parts of network plant that are within a physical network location. By way of example, a telephone exchange will contain many different network components, including main distribution frame, exchange line cards, exchange units of pair gain systems, etc.

6.2 Process flow chart

The following flow chart illustrates the assessment process flow. Each decision point is described in detail in the subsequent sections.



6.3 Detailed process description

The assessment process consists of multiple steps designed to identify whether a MP fault is to be assessed as a related fault or an unrelated fault. Given the often complex nature of faults affecting CSG services, this process has been designed to prevent any confusion by quickly eliminating any ambiguous results. Note: Appendices A, B and C contain examples of related and unrelated faults.

6.4 Assessment of same root cause

a. Did the MP fault occur at the same physical network location as one or more of the contravention faults?

i. If yes, then move to point b.

ii. if no, then go to section 6.5.

b. Was the MP fault located in the same network component or part of network plant as one or more of the contravention faults?

i. If yes, move to point c.

ii. If no, it will be necessary to determine if it was reasonable to expect Telstra to have addressed the root cause of the MP fault during its remediation activity. Where this is not the case, the MP fault is classified as having neither the same or a similar root cause and is to be assessed as an unrelated fault.

c. Did Telstra address and eliminate the root cause of the MP fault during its remediation activity?

i. If yes, the MP fault is classified as having neither the same or a similar root cause and is to be assessed as an unrelated fault.

ii. If no, the MP fault is classified as having the same root cause and is to be assessed as a related fault.

6.5 Assessment of similar root cause

a. Was the MP fault located in the same type of network component or same type of network plant as one or more of the contravention faults?

i. If yes, then move to point b.

ii If no, it will be necessary to determine if it was reasonable to expect Telstra to have addressed the root cause of the MP fault during its remediation activity. Where this is not the case, the MP fault is classified as having neither the same or a similar root cause and is to be assessed as an unrelated fault.

b. Was it reasonable to expect Telstra to have addressed the root cause of the MP fault during its remediation activity?

i. If yes, the MP fault is classified as having a similar root cause and is to be assessed as a related fault.

ii. If no, the MP fault is classified as having neither the same or a similar root cause and is to be assessed as an unrelated fault.

7. MEASURES

8. REFERENCES

- Carrier Licence Conditions (Telstra Corporation Limited) Declaration 1997 (as amended)
- Explanatory Statement - Carrier Licence Conditions (Telstra Corporation Limited) Declaration 1997 (Amendment No. 1 of 2006)

9. DEFINITIONS

The following words, acronyms and abbreviations are referred to in this document.

Term	Definition
ACMA	Australian Communications and Media Authority
CSG	Customer Service Guarantee
MDF	Main distribution frame
CMUX	Customer multiplexer

10. ATTACHMENTS

Document Number	Title

Appendix A

Examples of same root cause and related fault assessment

Example (actual case studies in brackets)	Root cause of one or more contravention faults	Root cause of MP fault	Did Telstra address and eliminate the root cause of the MP fault during its remediation activity?	Root cause classification	Related or unrelated
1 (CRRA-04-2008 - July 2008)	Faulty section of copper cable	Fault in same section of copper cable	No We failed to replace the corroded section of copper cable during remediation	Same root cause	Related
2	Faulty section of copper cable	Fault in same section of copper cable	Yes We replaced the corroded section of copper cable during remediation but it experienced subsequent lightning damage	Neither the same or a similar root cause	Unrelated
3 (MINT-03-2008 - May 2008)	Faulty lead-in cable	Fault in same section of lead-in cable	No We failed to replace the corroded section of lead-in cable during remediation	Same root cause	Related
4	Faulty aerial lead-in cable	Fault in same section of aerial lead-in cable	Yes The cause of the monitoring period fault was branches falling from overhanging trees. The customer was advised to prune the trees but failed to do so.	Neither the same or a similar root cause	Unrelated
5 (INGL-03-2008 - June 2008)	Faulty joint	Fault in same joint	No We failed to re-make the joint	Same root cause	Related

6	Faulty joint	Fault in same joint	Yes We re-made the joint during remediation but it experienced subsequent water damage as a result of a torrential downpour	Neither the same or a similar root cause	Unrelated
7 (BNLA-12-2007 - May 2008)	Electronic failure of PGS remote unit	Electronic failure of ***same*** PGS remote unit	No We determined that we should have replaced the PGS remote unit during remediation	Same root cause	Related
8 (GNIS-09-2007 – March 2008)	Electronic failure of PGS remote unit	Electronic failure of ***same*** PGS remote unit	Yes PGS remote unit was replaced at time of contravention fault and was working within specification at time of remediation, but was subsequently damaged by lightning	Neither the same or a similar root cause	Unrelated
9	Electronic failure of PGS remote unit	Electronic failure of replacement PGS remote unit	Yes We replaced the PGS remote unit during remediation but it experienced a subsequent general failure	Neither the same or a similar root cause	Unrelated
10 (GNIS-09-2007 - August 2008)	Electronic failure of PGS remote unit	Electronic failure of replacement PGS remote unit	Yes We replaced the PGS remote unit at time of first MP fault on 5 March 2008, but it was subsequently damaged by fire	Neither the same or a similar root cause	Unrelated
11	Faulty first socket	Faulty first socket	No We only re-terminated the faulty wiring when in fact the whole socket should have been replaced	Same root cause	Related

12 (GONH-09-2007 – January 2008)	Faulty first socket	Faulty first socket	Yes We replaced the socket during remediation but it was subsequently damaged by lightning	Neither the same or a similar root cause	Unrelated
13	Faulty first socket	Faulty first socket	Yes We replaced socket during remediation but the customer subsequently damaged the socket during refurbishment	Neither the same or a similar root cause	Unrelated

Appendix B

Examples of a similar root cause and related fault assessment

Example (actual case studies in brackets)	Root cause of one or more contravention faults	Root cause of MP fault	Is it reasonable to expect Telstra to have addressed the root cause of the MP fault during its remediation activity?	Root cause classification	Related or unrelated
1	Faulty section of copper distribution cable	Fault in different section of copper distribution cable	Yes We failed to conduct appropriate testing	Similar root cause	Related
2 (GLDE-03-2008 - August 2008)	Faulty section of copper distribution cable	Fault in different section of copper distribution cable	No We conducted appropriate testing that did not identify any potential problems	Neither the same or a similar root cause	Unrelated
3	Faulty joint	Fault in different joint	Yes We failed to conduct appropriate testing	Similar root cause	Related
4 (HASP-04-2008 - August 2008)	Faulty joint	Fault in different joint	No We conducted appropriate testing	Neither the same or a similar root cause	Unrelated

Appendix C

Examples of neither the same or a similar root cause and related fault assessment

Example (actual case studies in brackets)	Root cause of one or more contravention faults	Root cause of MP fault	Is it reasonable to expect Telstra to have addressed the root cause of the MP fault during its remediation activity?	Root cause classification	Related or unrelated
1 (TREG-03-2008 - August 2008)	Contravention faults were joint and main cable	Faulty MDF jumper	No We conducted appropriate testing but it did not identify any potential problems	Neither the same nor a similar root cause	Unrelated
2 (TBMS-06-2008 - August 2008)	Contravention faults were PGS power card, joint, lead-in cable and distribution cable	Faulty PGS transmission card	No We conducted appropriate testing but it did not identify any potential problems	Neither the same nor a similar root cause	Unrelated
3 (CESS-07-2008 - August 2008)	Contravention faults were first socket, joint and distribution cable	Electro-optical transport card in PGS at customer's premises	No We conducted appropriate testing but it did not identify any potential problems with electro-optical transport card	Neither the same nor a similar root cause	Unrelated
4 (GINK-01-2008 - March 2008)	Contravention faults were PGS remote unit, PGS connectors, joint, PGS transmission card and PGS line card	Faulty PGS exchange unit	No We conducted appropriate testing at time of remediation. MP fault was the result of lightning damage	Neither the same nor a similar root cause	Unrelated

5 (CTSX-11-2006 – January 2007)	Contravention faults were distribution cable and exchange equipment	Faulty joint	Yes We failed to undertake appropriate testing	Neither the same nor a similar root cause	Related

11. DOCUMENT CONTROL SHEET

Contact for Enquiries and Proposed Changes

If you have any questions regarding this document contact:

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If you have a suggestion for improving this document, complete and forward a copy of Suggestions for Improvements to Documentation (form 000 001-F01).

Record of Issues

Issue No	Issue Date	Nature of Amendment
	08/10/2008	Initial issue