

American National Standard for Telecommunications

STANDARD OUTAGE CLASSIFICATION

Secretariat

Alliance for Telecommunications Industry Solutions

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American National Standards Institute, Inc.

Abstract

This Standard provides a standard on the classification of outages for use by the telecommunications industry.

FOREWORD

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between carriers, customers, and manufacturers. The ATIS Network Reliability Steering Committee (NRSC) was formed at the request of the first Network Reliability Council (NRC-1) to monitor network reliability. NRSC is a consensus-based industry committee that analyzes the communications industry's reporting of network outages, makes recommendations aimed at improving network reliability, distributes the results of its findings to industry, and, where applicable, refers matters to appropriate industry forums for further resolution. The NRSC also reviews regulatory developments affecting network reliability and submits consensus-developed comments on matters of common interest to NRSC members.

ANSI guidelines specify two categories of requirements: mandatory and recommendation. The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, NRSC Secretariat, 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time it approved this document, NRSC, which is responsible for the development of this Standard, had the following members:

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~~0 INTRODUCTION/EXECUTIVE SUMMARY~~

Various systems for classifying outages exist in the telecommunications industry: aside from each company’s internal classification systems, a number of systems exist within requirements documents. Several systems also exist within the Federal Communications Commission (FCC)-also. The industry would benefit from a single standard system for classifying outages in the telecommunications industry. Such a system would provide a common language in the industry for outage cause definition. This is especially important for communication between vendors and service providers. It would also allow for comparable outage data to be collected throughout the industry. The standard addresses classification of outages with respect to cause.

In this revision of the Standard Outage Classification, an example is added as Appendix A to illustrate the degree to which the FCC Network Outage Reporting System (NORS) outage classification aligns with this standard. The example shows that additional levels of detail are used in the NORS classifications but not all classifications provide adequate information to identify the “what”, “why” and “who” of the outage according to the standard methodology.

~~1 SCOPE, PURPOSE AND APPLICATION~~

Various systems for classifying outages exist in the telecommunications industry: aside from each company’s internal classification systems, a number of systems exist within requirements documents. Several systems exist within the FCC also. The industry would benefit from a single standard system for classifying outages in the telecommunications industry. The standard addresses classification of outages with respect to cause.

~~2 NORMATIVE REFERENCES~~

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

~~Network Outage Reporting System: User Manual, Version 5, Federal Communications Commission, September 11, 2006.~~

Network Outage Reporting System: User Manual, Version 36, Federal Communications Commission, April 9, 2009 August 21, 2018.¹

~~Network Outage Reporting System: User Manual, Version 7, Federal Communications Commission, December 17, 2012.~~

Network Outage Reporting System: Glossary of Fields NORS Reports, Version 3, Federal Communications Commission, July 25, 2016.²

3 ABBREVIATIONS & ACRONYMS

ANSI	American National Standards Institute
ATIS	Alliance for Telecommunications Industry Solutions
DS3	Digital Signal Level 3
FCC	Federal Communications Commission
HVAC	Heating, Ventilating, and Air Conditioning
MOP	Manual of Procedures
NRSC	Network Reliability Steering Committee
OC3	Optical Carrier Level 3

4 CLASSIFICATION OF OUTAGE CAUSE

This clause describes a high-level system for classifying service outages with respect to cause.— An advantage of this system is its generic nature, which makes it applicable to any type of network. It also facilitates sorting and performing statistical analysis of outage causes.

4.1 Outage Cause Categories

The system uses three categories for classifying the cause of a service outage. The three categories are designed to capture information with respect to:

1. What failed in order to cause the service outage?
2. Why did the outage occur?
3. Who was responsible for the outage?

Each category is described below.

¹ This document is available at <https://www.fcc.gov/files/nors-user-manualpdf> (http://transition.fcc.gov/pshs/outage/nors_manual.pdf).

² This document is available at <https://www.fcc.gov/network-outage-reporting-system-nors>.

54 **Category 1: What failed in order to cause the service outage?**

55 The system provides a single level of description for what failed during a service outage. -However,
56 additional detail can be useful in providing a detailed analysis.- For this purpose an example of a
57 secondary level of “what” is provided in Appendix A as used by the FCC in their current version of the
58 Network Outage Reporting System (NORS).- Note that the secondary level of what is not a part of this
59 standard.

60

Table 1 What Primary

What - Primary	Description
Hardware	Physical network element equipment.
Software	Logic controlling network.
Firmware	Permanent software programmed into a read-only memory.
Cable	Facilities interconnecting network equipment.
Wireless Transmission	Transmission not requiring cables (e.g., wireless, microwave, satellite).
Capacity	System limits.

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64 **Category 2: Why did the service outage occur?**

65 The system provides two levels of description for why a service outage occurred. In some cases, only a
 66 primary category is needed, but most outages will require both primary and secondary categories.
 67 However, additional detail can be useful in providing a detailed analysis. For this purpose an example
 68 of a tertiary level of “why” is provided in Appendix A as used by the FCC in their current version of the
 69 Network Outage Reporting System (NORS). Again, this added level of detail is not a part of the standard.

70 **Table 2 Why Primary**

Why - Primary	Description
Damage	Impairment from external physical forces requiring replacement or repair.
Failure	Stopped working.
Design	Flaw in element.
Procedural	Improper use of elements.
Engineering	Policy with respect to use and deployment of network elements.
Traffic/System Overload	Abnormal surge in service demand.
Infrastructure Support	Outage caused by failure of internal supporting systems such as power and HVAC.
Planned/Scheduled	Outage caused by planned activity.
Other	Not listed but known.
Unknown	Not known.

71 **Table 3 Why Secondary**

Why - Secondary	Description
Accident	Unintentional act.
Procedure Violation	Act performed without regard to established practice/procedure.
Documentation	Problem with formal descriptions of product use, operation, or maintenance, such as manuals, instruction books, or MOPs.
Internal Environment	Abnormal indoor environmental condition.
External Environment	Abnormal outdoor environmental condition (including animal interference).
Intentional Act	Intentional damage (e.g., theft, sabotage, virus).
Supervision	Insufficient support of personnel (e.g. control, training, staffing).
Power Failure	Loss of power support.
Wear	Out of service for no apparent reason.
Spare	Spare parts were unavailable or were not operational.
Other	Not listed but known.
Unknown	Not known.

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74 Category 3: Who was responsible for the service outage?

75 Table 4 Who

Who	Description
Reporting Service Provider	Provider of communications service who is reporting the outage.
Other Service Provider	Provider of communications service other than the reporter of the outage.
System Vendor	Supplier of primary network element.
Other Vendor	Supplier of other components of the network.
Utility	Utility service provider other than communications service provider.
Government	Government organization/representative.
Contractor of Reporter	Individual/company providing service to the reporter of the outage.
Customer	Recipient of communications service.
Public individual/organization	Individual/organization whose act is unassociated with communications service.
Act of Nature	Forces of nature (including animals).
Other	Not listed but known.
Unknown	Not known.

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77 4.2 General Guidance

78 The combination of the three categories in 4.1 defines the *outage cause*.- While it is likely that certain
 79 category values will occur more commonly or even exclusively with others, the category definitions are
 80 independent of one another; that is, the value in one category does not preclude or exclude the use of a
 81 value in another category.

82 Outage databases constructed using this concept can be perceived as having one field for Category 1
 83 (What), two fields for Category 2 (Why-Primary and Why-Secondary), and one field for Category 3
 84 (Who). The concept of decomposing the outage cause into categories facilitates the statistical analysis of
 85 outage data.

86 The category values presented in this standard address the highest level of outage cause description with
 87 the broadest applicability across the industry. It is likely that individual companies or organizations may
 88 wish to provide more in-depth outage cause descriptions to focus on their own individual needs. The
 89 standard presented here provides a basis and structure for doing so. The decomposition concept allows
 90 additional fields to be added if needed where more precision is desired in the description. For example,
 91 Category 1 (What) could have an added field describing specific types of hardware and software
 92 elements that were the source of the outage. Such a level of description is beyond the scope of this
 93 standard, but the system described here provides a structure for such expansion of detail if desired.

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95 4.3 Examples of Application

96 The examples provided in Table 1 provide guidance on the application of the classification system to
 97 various outage scenarios. In particular, note should be made of scenarios involving acts of nature such
 98 as lightning or storms. It is often simplest to ascribe service outages arising from such events exclusively
 99 to Acts of Nature. However, in many cases, a thorough outage cause analysis will often find that true

responsibility for these outages lies elsewhere (e.g., with the service provider if proper precautions were not made, or with the vendor if the event was within the design tolerance of the failed equipment); several scenarios in Table 1 address the differences in classification for such outages.

Table 5 - Examples of Application to Various Outage Scenarios

Description	Category 1 - What	Category 2 - Why		Category 3 - Who
		Primary	Secondary	
DS3s-OC3s failed due to a fiber cut caused by a private land owner who was digging and cut the fiber.	Cable	Damage	Accident	Public individual/organization
Cable was accidentally cut by a construction contractor (working for the reporting service provider), although locates were done and were accurate.	Cable	Damage	Accident	Contractor of Reporter
Loss of service was incurred by the reporting service provider when a leased cable was accidentally cut by the leasing service provider.	Cable	Damage	Accident	Other Service Provider
Cable was cut when lightning struck a utility pole.	Cable	Damage	External Environment	Act of Nature
Cable was cut by a contractor for a private firm. Service provider failed to process the cable locate request from the contractor.	Cable	Damage	Procedure Violation	Reporting Service Provider
Cable was cut by a contractor installing a drainage pipe for a restaurant. No cable locate request was made.	Cable	Damage	Procedure Violation	Public individual/organization
Cable cut was caused by the county highway department which did not request a cable locate.	Cable	Damage	Procedure Violation	Government
High call volume in anticipation of an approaching hurricane resulted in network congestion.	Capacity	Traffic/System Overload	External Environment	Customer

Description	Category 1 - What	Category 2 - Why		Category 3 - Who
		Primary	Secondary	
Lightning strike exceeding the design tolerance of a receiver caused the failure of the receiver, which had to be replaced to restore service.	Hardware	Damage	External Environment	Act of Nature
Lightning strike caused the failure of the receiver, which had to be replaced to restore service. The receiver was improperly grounded.	Hardware	Damage	Procedure Violation	Reporting Service Provider
Lightning strike within the design tolerance of a receiver caused the failure of the receiver, which had to be replaced to restore service.	Hardware	Damage	External Environment	Vendor
High winds caused loss of service by satellite dish. Wind strength was within the design tolerance of dish.	Hardware	Failure	External Environment	Vendor
High winds caused loss of service by satellite dish. Satellite dish was not properly maintained to secure it in high winds.	Hardware	Failure	Procedure Violation	Reporting Service Provider
High winds caused loss of service by satellite dish. Wind strength was outside design tolerance of dish.	Hardware	Failure	External Environment	Act of Nature
A loss of protect resulted from a faulty amp. The spare amp was replaced, but alarms did not clear and service was not restored. An investigation found that the spare on site was an out of box failure from the vendor.	Hardware	Failure	Spare	Vendor
A loss of protect resulted from a faulty amp. Service was restored when the amp was replaced.	Hardware	Failure	Wear	Reporting Service Provider

Description	Category 1 - What	Category 2 - Why		Category 3 - Who
		Primary	Secondary	
Switch experienced a loss of commercial power. After transferring to standby generators, the cooling system failed to restart due to low voltage.	Hardware	Infrastructure Support	Power Failure	Reporting Service Provider
Translation error caused loss of calls. Translator did not consult documentation on how to do the work.	Software	Damage	Procedure Violation	Reporting Service Provider
An invalid pointer was added to an office retrofit tape, which caused trunk groups to experience failure.	Software	Design	Accident	Vendor
Software error in card produced false overload condition.	Software	Design	Accident	Vendor
An order request was submitted to disconnect a single toll free number. The order was inadvertently processed incorrectly by order processing personnel, consequently disconnecting all toll free numbers associated with the customer's account. Personnel were confused by a new layout screen for this procedure, which was not clearly documented.	Software	Design	Documentation	Vendor
Traffic was lost as a result of corruption of a card that occurred while a vendor performed a database update.	Software	Failure	Accident	Vendor
Newly constructed billboard interferes with microwave signal.	Wireless Transmission	Failure	Accident	Public individual/organization

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ANNEXPPENDIX A – ADDITIONAL LEVELS OF CLASSIFICATION AND COMPARISON TO FCC OUTAGE CATEGORIES

This section is strictly an example of how this guide compares to a classification methodology that is recommended by the NRSC for ~~currently in~~ use by the ~~United States Federal Communications Commission (US FCC)~~. It is not intended to be considered a part of the standard classification guidelines.

A.1 Additional Levels of Detail for What and Why

In order to make a mapping between the standard set of what-why-who and the existing NORS outage categories, an additional level was needed on both the “what” and the “why”. The following two tables show the additional levels of detail.

Table 6 What Secondary

What - Secondary	Description
Underground	Used With Cable To Differentiate Location
Aerial/Non-Buried	Used With Cable To Differentiate Location
Backplane	Used With Hardware To Provide More Detail
Card/Frame Mechanisms	Used With Hardware To Provide More Detail
Memory Unit	Used With Hardware To Provide More Detail
Peripheral Unit	Used With Hardware To Provide More Detail
Processor Community	Used With Hardware To Provide More Detail
Circuit Pack/Card Failure-Other	Used With Hardware To Provide More Detail
Circuit Pack/Card Failure-Processor	Used With Hardware To Provide More Detail
Passive Devices	Used With Hardware To Provide More Detail
Self-Contained Device	Used With Hardware To Provide More Detail
Shelf/Slot Failure	Used With Hardware To Provide More Detail
Software Storage Media Failure	Used With Hardware To Provide More Detail
Battery	Used With Hardware To Provide More Detail
Generator	Used With Hardware To Provide More Detail
Power Alarms	Used With Hardware To Provide More Detail
Power Equipment	Used With Hardware Or Capacity To Provide More Detail
Rectifier	Used With Hardware To Provide More Detail
Signaling Network	Used With Capacity To Provide Location In Network Experiencing Problem

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Add descriptions in the following table:

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Table 7 Why Tertiary

Why - Tertiary	Description
Un-Located	The "What" Was Not Properly Located Which Caused The Outage
Digging	Digging Caused The Outage
Notification	Lack Of Notification Caused The Outage
Accuracy	Accuracy Of Location Marking Of Cable Caused The Outage
Cable Shallow	Depth At Which Cable Is Buried Caused The Outage
Fault Recovery	Problems With Fault Recovery Caused The Outage (Generally Associated With Software)
Diagnostics	Problems With Diagnostics Caused The Outage (Generally Associated With Firmware Or Software)
Grounding	Problems With Grounding Of The Equipment Caused The Outage (Generally Associated With Hardware Design)
Backplane / Pin Arrangement	Problems With The Backplane/Pin Arrangement Caused The Outage (Generally Associated With Hardware Design)
Card/Frame Mechanisms	Problems With The Card/Frame Mechanisms Caused The Outage (Generally Associated With Hardware Design)
Office Data	Problems With The Office Data Caused The Outage (Generally Associated With Software Design)
Program Data	Problems With The Program Data Caused The Outage (Generally Associated With Software Design)
Defensive Checks	Problems With The Defensive Checks Caused The Outage (Generally Associated With Software Design)
Diversity	Problems With Diversity Caused The Outage
Animal	Problems With Animals Caused The Outage (Generally Associated With External Environment)
Earthquake	Problems With An Earthquake Caused The Outage (Generally Associated With External Environment)
Fire	Problems With Fire Caused The Outage (Generally Associated With Internal Or External Environment)
Flood	Problems With A Flood Caused The Outage (Generally Associated With External Environment)
Lightning/Transient Voltage	Problems With Lightning/Transient Voltage Caused The Outage (Generally Associated With External Environment)
Storm - Water/Ice	Problems With A Storm Including Water/Ice Caused The Outage (Generally Associated With External Environment)
Storm - Wind/Trees	Problems With A Storm Including Wind And/Or Trees Caused The Outage (Generally Associated With External Environment)
Vandalism/Theft	Problems With Vandalism Or Theft Caused The Outage (Generally Associated With External Environment)
Vehicular Accident	Problems With A Vehicular Accident Caused The Outage (Generally Associated With External Environment)

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Pressurization	Problems With Pressurization Caused The Outage (Generally Associated With Internal Environment)
Dust	Problems With Pressurization Caused The Outage (Generally Associated With Internal Environment)
HVAC vae	Problems With Pressurization Caused The Outage (Generally Associated With Internal Environment)
Fire Suppression Damage	Problems With Fire Suppression Damage Caused The Outage (Generally Associated With Internal Environment)
Leak	Problems With A Leak Caused The Outage (Generally Associated With Internal Environment)
Breaker Tripped/Blown Fuses	Problems With A Tripped Breaker Or Blown Fuses Caused The Outage (Generally Associated With A Power Failure)
Extended Commercial Power Failure	Problems With An Extended Commercial Power Failure Caused The Outage (Generally Associated With A Power Failure)
Generator Failure	Problems With A Generator Failure Caused The Outage (Generally Associated With A Power Failure)
Maintenance/Testing	Lack Of Routine Maintenance Or Testing Caused The Outage (Generally Associated With A Power Failure)
Power Surge	Problems With A Power Surge Caused The Outage (Generally Associated With A Power Failure)
Out-Of-Date, Unusable, Impractical	Used With Procedural Documentation Problems To Provide More Detail
Unavailable/Unclear/Incomplete	Used With Procedural Documentation Problems To Provide More Detail
Insufficient Staffing/Support	Used With Procedural Supervision To Provide More Detail
Insufficient ___Supervision/Control ___Or Employee Error	Used With Procedural Supervision To Provide More Detail
Insufficient Training	Used With Procedural Supervision To Provide More Detail
Routine Maintenance/Memory Or Data Back-Up	Used With Planned/Scheduled + Procedural Violation To Provide More Detail
Not Available	Used With Failure – Spare To Provide More Detail
Manufacture Discontinued	Used With Failure – Spare To Provide More Detail
On Hand - Failed	Used With Failure – Spare To Provide More Detail
Network Management Controls	Used With Traffic/System Overload – Procedural Violation To Provide More Detail
Ineffective Engineering/Engineering Tools	Used With Traffic/System Overload – Other To Provide More Detail
Mass Calling	Used With Traffic/System Overload – Other Or Procedural Violation To Provide More Detail

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125 On the following pages is a mapping created by NRSC members of the NORS Outage Categories
 126 (Primary and Secondary) to the Standard Outage Classification (What, Why Primary, Why Secondary
 127 and Who). Additionally, the added levels of What Secondary and Why Tertiary are shown to highlight

128 the added level of detail needed to make the mapping accurate. In instances where the matrix indicates
129 – “Several Possible,” it would indicate that the NORS category does not accurately describe the outage
130 in terms of the Standard Outage Classification guidelines.

131 An example of the “several possible” is illustrated on the fifth line of the table (not counting header
132 lines). In this example, “several possible” is used because from the why secondary list, the values
133 could be procedural violation, documentation, supervision, accident, unknown or other. Another
134 example of this occurs on the line where the NORS Outage Cause is “Diversity Failure – External”.
135 With this classification, the what and the why primary are not clearly defined. Within the standard
136 guidelines, there are several values that would work in either of these columns.

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~~Standard Outage Classification~~

A.2 Comparison of NORS and Standard Outage Categories

Table 8 Comparison of NORS and Standard Outage Classification Guides

NORS Cause Code - Main	NORS Cause Code - Second	What	What Secondary	Why Primary	Why Secondary	Why Tertiary	Who
Cable Damage	Cable Un-Located	Cable	Underground	Damage	Procedural	Un-Located	Several Possible
Cable Damage	Digging Error	Cable	Underground	Damage	Procedural	Digging	Several Possible
Cable Damage	Inadequate/No Notification	Cable	Underground	Damage	Procedural	Notification	Several Possible
Cable Damage	Inaccurate/Incomplete Cable Locate	Cable	Underground	Damage	Procedural	Accuracy	Several Possible
Cable Damage	Shallow Cable	Cable	Underground	Damage	Several Possible	Cable Shallow	Several Possible
Cable Damage	Other	Cable	Underground	Damage	Unknown		Several Possible
Cable Damage/Malfunction	Aerial/Non-Buried	Cable	Aerial/Non-Buried	Damage			Several Possible
Cable Damage/Malfunction	Cable Malfunction Underground/Buried	Cable	Underground	Failure			Reporting Service Provider
Design - Firmware	Ineffective Fault Recovery Or Re-Initialization Action	Firmware		Design	Other	Fault Recovery	System Vendor
Design - Firmware	Insufficient Software State Indications	Firmware		Design	Other	Diagnostics	System Vendor
Design - Firmware	Other	Firmware		Design	Other		System Vendor
Design - Hardware	Inadequate Grounding Strategy	Hardware		Design	Other	Grounding	Several Possible

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NORS Cause Code - Main	NORS Cause Code - Second	What	What Secondary	Why Primary	Why Secondary	Why Tertiary	Who
Design - Hardware	Poor Backplane Or Pin Arrangement	Hardware	Backplane	Design	Other	Backplane / Pin Arrangement	System Vendor
Design - Hardware	Poor Card/Frame Mechanisms (Latches, Slots, Jacks, Etc.)	Hardware	Card/Frame Mechanisms	Design	Other	Card/Frame Mechanisms	System Vendor
Design - Hardware	Other	Hardware		Design	Other		System Vendor
Design – Software	Faulty Software Translations Faulty software load - office data	Software		Design	Other	Office Data	Reporting Service Provider
Design – Software	Faulty Software Load - Program Data	Software		Design	Other	Program Data	System Vendor
Design – Software	Inadequate Defensive Checks	Software		Design	Other	Defensive Checks	System Vendor
Design – Software	Ineffective Fault Recovery Or Re-Initialization Action	Software		Design	Other	Fault Recovery	System Vendor
Design – Software	Other	Software		Design	Other		System Vendor
Diversity Failure	External	Several Possible		Several Possible	Procedural Violation	Diversity	Reporting Service Provider
Diversity Failure	Links	Hardware		Several Possible	Procedural Violation	Diversity	Reporting Service Provider
Diversity Failure	Power	Hardware		Engineering	Power Failure	Diversity	Reporting Service Provider
Diversity Failure	Timing Equipment	Hardware		Engineering		Diversity	Reporting Service Provider
Diversity Failure	Customer Specified Single Circuit	Hardware		Engineering		Diversity	Customer
Diversity Failure	Internal (Other)	Several Possible		Other	Other	Diversity	Reporting Service Provider
Environment – External	Animal Damage	Several Possible		Damage	External Environment	Animal	Act Of Nature
Environment – External	Earthquake	Several Possible		Damage	External Environment	Earthquake	Act Of Nature
Environment – External	Fire	Several Possible		Damage	External Environment	Fire	Act Of Nature
Environment – External	Flood	Several Possible		Damage	External Environment	Flood	Act Of Nature
Environment – External	Lightning/Transient Voltage	Several Possible		Damage	External Environment	Lightning/Transient Voltage	Act Of Nature

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NORS Cause Code - Main	NORS Cause Code - Second	What	What Secondary	Why Primary	Why Secondary	Why Tertiary	Who
Environment – External	Storm - Water/Ice	Several Possible		Damage	External Environment	Storm - Water/Ice	Act Of Nature
Environment – External	Storm - Wind/Trees	Several Possible		Damage	External Environment	Storm - Wind/Trees	Act Of Nature
Environment – External	Vandalism/Theft	Several Possible		Damage	External Environment	Vandalism/Theft	Several Possible
Environment – External	Vehicular accident Incident	Several Possible		Damage	External Environment	Vehicular Accident	Several Possible
<u>Environment – External</u>	<u>Construction/Road Work</u>	<u>Several Possible</u>		<u>Damage</u>			<u>Several Possible</u>
<u>Environment – External</u>	<u>Access Restricted</u>	<u>Several Possible</u>		<u>Several Possible</u>			<u>Several Possible</u>
Environment – External	Other	Several Possible		Damage	Internal Environment		Reporting Service Provider
Environment (Internal)	Cable Pressurization Failure	Cable		Failure	Internal Environment	Pressurization	Reporting Service Provider
Environment (Internal)	Dirt, Dust Contamination	Hardware		Damage	Internal Environment	Dust	Reporting Service Provider
Environment (Internal)	Environmental System Failure (Heat/Humidity)	Hardware		Failure	Internal Environment	HVAC	Reporting Service Provider
Environment (Internal)	Fire, Arcing, Smoke Damage	Hardware		Damage	Internal Environment	Fire	Reporting Service Provider
Environment (Internal)	Fire Suppression (Water, Chemicals) Damage	Hardware		Damage	Internal Environment	Fire Suppression Damage	Reporting Service Provider
Environment (Internal)	Manhole/Cable Vault Leak	Several Possible		Damage	Internal Environment	Leak	Reporting Service Provider
Environment (Internal)	Roof/Air Conditioning Leak	Several Possible		Damage	Internal Environment	Leak	Reporting Service Provider
Environment (Internal)	Other	Several Possible		Other	Internal Environment		Reporting Service Provider
Hardware Failure	Memory Unit Failure	Hardware	Memory Unit	Failure			Reporting Service Provider

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NORS Cause Code - Main	NORS Cause Code - Second	What	What Secondary	Why Primary	Why Secondary	Why Tertiary	Who
Hardware Failure	Peripheral Unit Failure	Hardware	Peripheral Unit	Failure			Reporting Service Provider
Hardware Failure	Processor community failure	Hardware	Processor community	Failure			Reporting Service Provider
Hardware Failure	Circuit Pack/Card Failure-Other	Hardware	Circuit Pack/Card Failure-Other	Failure			Reporting Service Provider
Hardware Failure	Circuit Pack/Card Failure-Processor	Hardware	Circuit Pack/Card Failure-Processor	Failure			Reporting Service Provider
Hardware Failure	Passive Devices	Hardware	Passive Devices	Failure			Reporting Service Provider
Hardware Failure	Self-Contained Device Failure	Hardware	Self-Contained Device	Failure			Reporting Service Provider
Hardware Failure	Shelf/Slot Failure	Hardware	Shelf/Slot Failure	Failure			Reporting Service Provider
Hardware Failure	Software Storage Media Failure	Hardware	Software Storage Media Failure	Failure			Reporting Service Provider
Hardware Failure	Device Reset Or Reseated	Hardware		Failure			Reporting Service Provider
Hardware Failure	Inadequate Grounding	Hardware		Failure			Reporting Service Provider
Hardware Failure	Other	Hardware		Failure			Reporting Service Provider
Insufficient Data	Insufficient Data "Blank"	Unknown		Unknown	Unknown		Reporting Service Provider
Insufficient Data	Cleared While Testing	Unknown					Reporting Service Provider
Insufficient Data	Non-Service Provider Personnel	Unknown					Reporting Service Provider

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NORS Cause Code - Main	NORS Cause Code - Second	What	What Secondary	Why Primary	Why Secondary	Why Tertiary	Who
Insufficient Data	Outside Owned Network	Unknown					Reporting Service Provider
Insufficient Data	Under Investigation	Unknown					Reporting Service Provider
Insufficient Data	Other/Unknown	Unknown					Reporting Service Provider
Other/Unknown		Other/Unknown		Other/Unknown	Other/Unknown		Other/Unknown
<u>Planned Maintenance</u>	<u>To Upgrade The System</u>	<u>Several Possible</u>		<u>Planned/Scheduled</u>	<u>Several Possible</u>		<u>Several Possible</u>
<u>Planned Maintenance</u>	<u>To Fix Known Problem</u>	<u>Several Possible</u>		<u>Planned/Scheduled</u>	<u>Several Possible</u>		<u>Several Possible</u>
<u>Planned Maintenance</u>	<u>Failed</u>	<u>Several Possible</u>		<u>Planned/Scheduled</u>	<u>Several Possible</u>		<u>Reporting Service Provider</u>
<u>Planned Maintenance</u>	<u>Went Longer Or Was Worse Than Expected</u>	<u>Several Possible</u>		<u>Planned/Scheduled</u>	<u>Several Possible</u>		<u>Several Possible</u>
<u>Planned Maintenance</u>	<u>Customer/Customer/Vendor</u>	<u>Several Possible</u>		<u>Planned/Scheduled</u>	<u>Several Possible</u>		<u>Several Possible</u>
Power Failure (Commercial And/Or Back-Up)	Battery Failure	Hardware	Battery	Failure	Power Failure		Reporting Service Provider
Power Failure (Commercial And/Or Back-Up)	Breaker Tripped/Blown Fuses	Hardware		Failure	Power Failure	Breaker Tripped/Blown Fuses	Reporting Service Provider
Power Failure (Commercial And/Or Back-Up)	Extended Commercial Power Failure	Hardware		Infrastructure Support	Power Failure	Extended Commercial Power Failure	Utility
Power Failure (Commercial And/Or Back-Up)	Generator Failure	Hardware	Generator	Failure	Power Failure	Generator Failure	Reporting Service Provider
Power Failure (Commercial And/Or Back-Up)	Inadequate/Missing Power Alarm	Hardware	Power Alarms	Several Possible	Power Failure		Reporting Service Provider
Power Failure (Commercial And/Or Back-Up)	Inadequate Back-Up Power Equipment Located On Customer Premise	Hardware/Capacity	Power Equipment	Several Possible	Power Failure		Customer
Power Failure (Commercial and/or Back-up)	Inadequate site-specific power contingency plans	Hardware/Capacity		Procedural/Engineering	Power failure		Reporting Service Provider

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NORS Cause Code - Main	NORS Cause Code - Second	What	What Secondary	Why Primary	Why Secondary	Why Tertiary	Who
Power Failure (Commercial And/Or Back-Up)	Insufficient Response To Power Alarm	Hardware		Procedural	Power Failure		Several Possible
Power Failure (Commercial And/Or Back-Up)	Lack Of Power Redundancy	Hardware		Design/Engineering	Power Failure		Reporting Service Provider
Power Failure (Commercial And/Or Back-Up)	Lack Of Routine Maintenance/Testing	Hardware		Procedural	Power Failure	Maintenance/Testing	Reporting Service Provider
Power Failure (Commercial And/Or Back-Up)	Overloaded/Undersized Power Equipment	Hardware/Capacity		Design/Engineering	Power Failure		Reporting Service Provider
Power Failure (Commercial And/Or Back-Up)	Overloaded/Undersized Power Equipment	Hardware/Capacity		Design/Engineering	Power Failure		Reporting Service Provider
Power Failure (Commercial And/Or Back-Up)	Rectifier Failure	Hardware	Rectifier	Failure	Power Failure		Reporting Service Provider
Power Failure (Commercial and/or Back-up)	Scheduled Activity-Software Upgrade	Software		Planned/Scheduled	Power failure		Several possible
Power Failure (Commercial and/or Back-up)	Scheduled Maintenance-Hardware Replacement	Hardware		Planned/Scheduled	Power failure		Several possible
Power Failure (Commercial And/Or Back-Up)	Unidentified Power Surge	Hardware		Unknown	Power Failure	Power Surge	Reporting Service Provider
Power Failure (Commercial And/Or Back-Up)	Other	Hardware		Other/Unknown	Power Failure		Several Possible
Procedural - Other Vendor	Ad Hoc Activities, Outside Scope Of MOP	Several Possible		Procedural	Several Possible		Other Vendor
Procedural - Other Vendor	Documentation/Procedures Out-Of-Date, Unusable, Impractical	Several Possible		Procedural	Documentation	Out-Of-Date, Unusable, Impractical	Other Vendor
Procedural - Other Vendor	Documentation/Procedures Unavailable, Incomplete	Several Possible		Procedural	Documentation	Unavailable/Unclear/Incomplete	Other Vendor
Procedural - Other Vendor	Insufficient Staffing/Support	Several Possible		Procedural	Supervision	Insufficient Staffing/Support	Other Vendor
Procedural - Other Vendor	Insufficient Supervision/Control Or Employee Error	Several Possible		Procedural	Supervision	Insufficient Supervision/Control Or Employee Error	Other Vendor
Procedural - Other Vendor	Insufficient Training	Several Possible		Procedural	Supervision	Insufficient Training	Other Vendor

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NORS Cause Code - Main	NORS Cause Code - Second	What	What Secondary	Why Primary	Why Secondary	Why Tertiary	Who
Procedural - Other Vendor	Other	Several Possible		Procedural	Other		Other Vendor
Procedural - Service Provider	Documentation/Procedures Out-Of-Date, Unusable Or Impractical	Several Possible		Procedural	Documentation	Out-Of-Date, Unusable, Impractical	Reporting Service Provider
Procedural - Service Provider	Documentation/Procedures Unavailable/Unclear/Incomplete	Several Possible		Procedural	Documentation	Unavailable/Unclear/Incomplete	Reporting Service Provider
Procedural - Service Provider	Inadequate Routine Maintenance/Memory Or Data Back-Up	Several Possible		Planned/Scheduled	Procedural Violation	Routine Maintenance/Memory Or Data Back-Up	Reporting Service Provider
Procedural - Service Provider	Insufficient Staffing/Support	Several Possible		Procedural	Supervision	Insufficient Staffing/Support	Reporting Service Provider
Procedural - Service Provider	Insufficient Supervision/Control Or Employee Error	Several Possible		Procedural	Supervision	Insufficient Supervision/Control Or Employee Error	Reporting Service Provider
Procedural - Service Provider	Insufficient Training	Several Possible		Procedural	Supervision	Insufficient Training	Reporting Service Provider
Procedural - Service Provider	Other	Several Possible		Procedural	Other		Reporting Service Provider
Procedural - System Vendor	Ad Hoc Activities, Outside Scope Of MOP	Several Possible		Procedural	Several Possible		System Vendor
Procedural - System Vendor	Documentation/Procedures Out-Of-Date Unusable Or Impractical	Several Possible		Procedural	Documentation	Out-Of-Date, Unusable, Impractical	System Vendor
Procedural - System Vendor	Documentation/Procedures Unavailable/Unclear/Incomplete	Several Possible		Procedural	Documentation	Unavailable/Unclear/Incomplete	System Vendor
Procedural - System Vendor	Insufficient Staffing/Support	Several Possible		Procedural	Supervision	Insufficient Staffing/Support	System Vendor
Procedural - System Vendor	Insufficient Supervision/Control Or Employee Error	Several Possible		Procedural	Supervision	Insufficient Supervision/Control Or Employee Error	System Vendor
Procedural - System Vendor	Insufficient Training	Several Possible		Procedural	Supervision	Insufficient Training	System Vendor
Procedural - System Vendor	Other	Several Possible		Procedural	Other		System Vendor
Simplex Condition	Non-Service Affecting						
Simplex Condition	Service Affecting						

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NORS Cause Code - Main	NORS Cause Code - Second	What	What Secondary	Why Primary	Why Secondary	Why Tertiary	Who
Spare	Not Available	Hardware		Failure	Spare	Not Available	Several Possible
Spare	Manufacturer Discontinued (MD)Not on hand — MD	Hardware		Failure	Spare	Manufacture Discontinued	Several Possible
Spare	On Hand - Failed	Hardware		Failure	Spare	On Hand - Failed	Several Possible
Traffic/System Overload	Signaling Network Overload	Capacity	Signaling Network	Traffic/System Overload			Reporting Service Provider
Traffic/System Overload	Signaling Network Overload	Capacity	Signaling Network	Traffic/System Overload			Reporting Service Provider
Traffic/System Overload	Signaling Network Overload	Capacity	Signaling Network	Traffic/System Overload			Reporting Service Provider
Traffic/System Overload	Inappropriate/Insufficient NM Control(S)	Capacity		Traffic/System Overload	Procedural Violation	Network Management Controls	Reporting Service Provider
Traffic/System Overload	Ineffective Engineering/Engineering Tools	Capacity		Traffic/System Overload	Other	Ineffective Engineering/Engineering Tools	Reporting Service Provider
Traffic/System Overload	Mass Calling - Focused/Diffuse Network Overload	Capacity		Traffic/System Overload	Other	Mass Calling	Several Possible
Traffic/System Overload	Media-Stimulated Calling - Insufficient Notification	Capacity		Traffic/System Overload	Procedural Violation	Mass Calling	Public Ind/Org
Traffic/System Overload	Other	Capacity		Traffic/System Overload	Other/Unknown		Several Possible