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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 Forewordis 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 Forewordmay 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 exist within the 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.[[1]](#footnote-1)

Network Outage Reporting System: User Manual, Version 6, Federal Communications Commission, April 9, 2009.[[2]](#footnote-2)

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

# 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 |

# 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.

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

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

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. |

### Category 2: Why did the service outage occur?

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

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. |

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. |

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

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. |

## 4.2 General Guidance

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

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

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

## 4.3 Examples of Application

The examples provided in Table 1 provide guidance on the application of the classification system to various outage scenarios. In particular, note should be made of scenarios involving acts of nature such as lightning or storms. It is often simplest to ascribe service outages arising from such events exclusively 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 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 |
| 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 |
| 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 |

# Appendix 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 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 |

Add descriptions in the following table.

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) |
| 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 | 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 |

On the following pages is a mapping created by NRSC members of the NORS Outage Categories (Primary and Secondary) to the Standard Outage Classification (What, Why Primary, Why Secondary and Who). Additionally, the added levels of What Secondary and Why Tertiary are shown to highlight the added level of detail needed to make the mapping accurate. In instances where the matrix indicates – “Several Possible”, it would indicate that the NORS category does not accurately describe the outage in terms of the Standard Outage Classification guidelines.

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

## 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 | 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 |
| 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 |   | 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 |
| 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 incident |   | Several possible |  | Damage | External environment | Vehicular accident | Several possible |
| Environment – External | Construction/Road Work |  | Several possible |  | Damage |  |  | Several possible |
| Environment – External | Access Restricted |  | Several possible |  | Several possible |  |  | Several possible |
| 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 |
| Hardware Failure | Peripheral unit failure |   | Hardware | Peripheral unit | 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 |
| 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 |
| Planned Maintenance | To Upgrade the System |  | Several possible |  | Planned/Scheduled | Several possible |  | Several possible |
| Planned Maintenance | To Fix Known Problem |  | Several possible |  | Planned/Scheduled | Several possible |  | Several possible |
| Planned Maintenance | Failed |  | Several possible |  | Planned/Scheduled | Several possible |  | Reporting Service Provider |
| Planned Maintenance | Went Longer or Was Worse than Expected |  | Several possible |  | Planned/Scheduled | Several possible |  | Several possible |
| Planned Maintenance | Customer/Vendor |  | Several possible |  | Planned/Scheduled | Several possible |  | Several possible |
| 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) | 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) | Rectifier Failure |   | Hardware | Rectifier | Failure | Power failure |  | Reporting Service Provider |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| 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 |
| 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 |   |  |  |  |  |  |  |
| Spare | Not available |   | Hardware |  | Failure | Spare | Not Available | Several Possible |
| Spare | Manufacturer Discontinued (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 | 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 |

1. This document is available at < [www.fcc.gov/oet/outage/nors\_manual.pdf](http://www.fcc.gov/oet/outage/nors_manual.pdf) >. [↑](#footnote-ref-1)
2. This document is available at , < <http://transition.fcc.gov/pshs/outage/nors_manual.pdf> >. [↑](#footnote-ref-2)