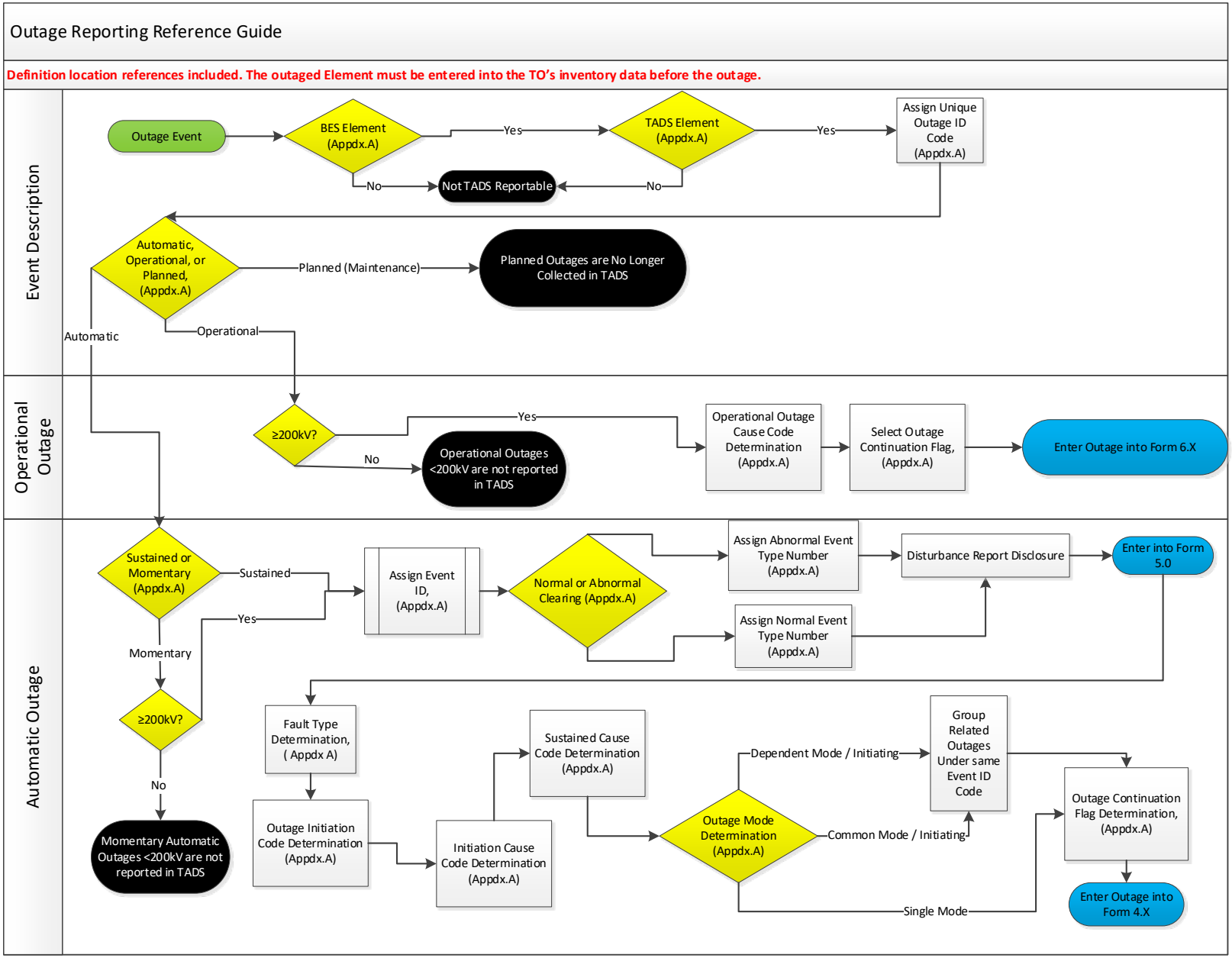

Figure I.1: Outage Reporting Reference Guide

NERC Multiple Utility Event ID Code Creation

NERC Multiple Utility (NMU) Event ID Codes are special Event ID Codes that tie related Outages crossing TO or RE boundaries into the same Event ID Code. As part of the TADS program, TOs should combine related multiple-TO Outages that include other TOs by using a single NMU Event ID Code. In contrast, related Outages occurring within only a single TOs territory should be coded with the same Event ID Code that is created by the TO.

When a TADS Event involves related Outages across TOs, each Outage should be given the same NMU Event ID Code. These codes are defined globally by NERC, usually through an NMU registration by one of the affected TOs. Once created, all of the involved TOs may use that Event ID for their Outages in the Event.

To create an NMU Event ID Code within webTADS, TOs may select the NERC by changing the filter from their company to NERC within Form 5.0. Then, the TO creates an NMU TADS Event using the relevant interface buttons. WebTADS will assign, automatically, a new NMU Event ID for all involved TOs to use in their Outages for that Event.

Cascading Tolerance

If multiple Outages are associated to the same Event ID, they should occur within one minute of each other. If Outages are entered that are more than one minute apart, the Company user will receive an import warning message. An override must be requested in order for the Outages to be accepted as valid. When a Company user receives the tolerance warning message, a button labeled 'Request Override' is displayed at the bottom of the form page. When the 'Request Override' button is pressed, an email is sent to the Company user, NERC and the Regional contact. The Regional contact will then login and approve the override. This will change the read only field 'Extended Cascading Tolerance' on Form 5.0 from the default of No to Yes.

Event Type Numbers

Every TADS event is defined an Event Type Number to describe the general circumstances of the outage. A classification of the Event as Normal and Abnormal Clearing initially divides the Event Type Numbers. Then, Events with Normal Clearing are subdivided by the number of involved Elements, involvement of a bus section or common structure involvement. Abnormally Clearing Events are subdivided by the classification of breaker failure, dependability-based protection system misoperations, or security-based protection system misoperations.

Table 5.2: Event Type Number Descriptions: Events with Normal Clearing

Event Type No.	Description
05	Single bus section fault or failure resulting in one or more Automatic Outages.
06	Single internal circuit breaker fault resulting in one or more Automatic Outages.
11	Automatic Outage of a single Element not covered by Event Type Numbers 05 and 06.
13	Automatic Outage of two or more Elements within one Normal Clearing Circuit Breaker Set (NCCBS).
31	Automatic Outages of two or more TADS adjacent AC Circuits or DC Circuits on common structures. To qualify as Event Type Number 31 the Automatic Outages must be the direct result of the circuits occupying common structures.
49	Automatic Outage(s) with Normal Clearing not covered by Event Type Numbers 05 through 31 above.

All of the above Event Type Numbers, 05 to 49, are Events with Normal Clearing. For further explanations and examples regarding the determination of the proper Event Type Numbers, see Appendix A definitions for Normal Clearing, NCCBS, Abnormal Clearing, Delayed Fault Clearing, Special Protection System (SPS) or Remedial Action Scheme (RAS), and Event Type Number. These Event Type Numbers apply only when the Automatic Outages are the result of Protection Systems and controls disconnecting the Elements that are expected to be automatically

disconnected for a single event. In contrast, the term Abnormal Clearing is for an Event when Normal Clearing did not occur.

Table 5.3: Event Type Number Descriptions: Events with Abnormal Clearing	
Event Type No.	**Description**
60	**Breaker Failure:** One or more Automatic Outages with Delayed Fault Clearing due to a circuit breaker being stuck, slow to open or failure to interrupt current.
61	**Dependability (failure to operate):** One or more Automatic Outages with Delayed Fault Clearing due to the failure of a composite protection scheme under either… a. failure to initiate the isolation of a faulted power system Element as designed, or within its designed operating time, or In the absence of a fault, failure to operate as intended within its designed operating time. (Item b is a very rare type of event.)
62	**Security (unintended operation):** One or more Automatic Outages caused by improper operation (e.g. overtrip) of a Protection System resulting in isolating one or more TADS Elements it is not intended to isolate, either during a fault or in the absence of a fault.
90	Automatic Outage(s) with Abnormal Clearing not covered by Event Types 60 through 62 above.

All of the above Event Type Numbers, 60 to 90, are Events with Abnormal Clearing. For further explanations and examples regarding the determination of the proper Event Type Numbers, see **Appendix A** definitions for Normal Clearing, NCCBS, Abnormal Clearing, Delayed Fault Clearing, SPS or RAS, and Event Type Number.

Non-TADS Element Outages

Please note: Event Type Number 11 (Automatic Outage of a single Element) is intended to include a single Automatic Outage resulting from one or more non-TADS Element outages. This type of Event should not be entered as Event Type Number 49 other Normal Clearing. If the Element outage results from one or more non-TADS Element outages, the Outage Initiation Code (Form 4) should be entered as "Dependent Mode".

Event Type Number 13 versus Event Type Number 11

Event Type Number 13 is similar to Event Type Number 11 except a total of two or more Element outages occur within one NCCBS. By keeping type 13 separate from type 11, statistical granularity can be maintained in the annual report.

If two or more Automatic Outages occur (within one NCCBS) which result from one or more non-TADS Element outages, Event Type Number 13 should be entered and the Outage Initiation Code (Form 4) should be entered as "Dependent Mode" on each Automatic Outage. If two or more Automatic Outages occur outside of the Normal Clearing Circuit Breaker Set, do not enter Event Type Number 13. See the Event Analysis Guideline below.

Event Description

An optional event description may be entered on Form 5.0 in the Description column. In general for Event Type Numbers 05 to 31 (Normal Clearing), and Event Types 60 to 62 (Abnormal Clearing) a description is not needed but may be entered. However, for Event Type Number 49 (other Normal Clearing) or 90 (other Abnormal Clearing), entering a description of the Event would be helpful. Such a description, although not mandatory, would provide further clarification of these Events.

Event Analysis Guidelines

When using the revised Event Type Numbers, to reduce the amount of analysis labor required in determining the Event Type code numbers, the following systematic process contains a sample of logical questions and answers to determine the appropriate Event Type Number to be entered on Form 5.0. Several examples are included in this Instruction Manual with both the given Automatic Outage (Form 4.x) attributes and after using the Steps below, the appropriate determination of Event Type (Form 5.0). Data entries for each scenario are shown in tables along with each scenario. While not all possible situations could be covered, the examples are complete enough to illustrate Event Type determination.

The process below assumes that all Automatic Outage information required for completion of Form 4.x have already been collected and are available to the user. The user should be familiar with the TADS definitions in **Appendix A** for: Normal Clearing, NCCBS, Abnormal Clearing, Delayed Fault Clearing, SPS or RAS, Event, Event ID Code, and Event Type Number. Form 4.x data and associated event analysis are necessary for the determination of the Event Type number to be entered on Form 5.0. Event Type analysis should not begin until a complete set of Automatic Outages associated which each Event is ready for entry on Form 4.x including their associated event identification (Event ID) code.

The analysis Steps below are intended to reduce the labor resources to complete the determination of Event Type for entry on Form 5.0. The steps below will not reduce the labor needed to determine the Form 4 data to be entered for each Automatic Outage. This is a guideline and exceptions can be made as deemed necessary to determine the appropriate Event Type. It is anticipated that the overwhelming majority of Automatic Outages (2 of every 3 outages) will be a simple Normal Clearing of a single Element Automatic Outage which did not result from a bus outage or internal circuit breaker fault. For such cases, no additional resources will be necessary to determine the Event Type. Only Steps N1 and N3.1 below will be needed to determine the Event Type Number.

Event Type Number Determination

Begin at Step N1 with a set of one or more Automatic Outages entered on Form 4.x that has a unique Event ID Code. Follow the process until an Event Type Number for each Event is determined.

Step N1 - Normal Clearing determination

Did Abnormal Clearing occur? (Refer to examples below.)

- Yes – Proceed with Step A1 – Abnormal Clearing below.
- No – Proceed with Step N1 – Normal Clearing.

Example of an Event with Normal Clearing

For a given Event ID and its associated Automatic Outages, an Event which results from one or more unintended circuit breaker operations or unintended delayed clearing should be coded as Abnormal Clearing. Abnormal Clearing, per Section B definition, is the outage of a TADS Element that does not conform with Normal Clearing. For example, any unintended circuit breaker operations which occur beyond the NCCBS and results in a total of two or more Automatic Outages should be categorized as Abnormal Clearing.

Example of an Event with Normal Clearing beyond the NCCBS

SPS or RAS may normally trip additional 100 kV or above circuit breakers beyond the NCCBS. For a given Event ID and its associated Automatic Outages, an Event which results from one or more expected SPS or RAS normal operations should be coded as Normal Clearing.

Step N2 - Screen for Event Type Numbers 05 and 06

- If one or more Automatic Outages were the result of a Bus Section fault or failure, enter Event Type Number 05.

- If one or more Automatic Outages were the result of a single internal circuit breaker fault, enter Event Type Number 06.
- If not Event Type Number 05 or 06, then proceed with Step N3 below.

Step N3 – Screen for Event Type Numbers 11 and 13

- N3.1) If the Outage Mode Code was "Single Mode Outage", enter Event Type Number 11.
- N3.2) For an Event ID with a total of two or more Automatic Outages that occur within one NCCBS, enter Event Type Number 13. The Outage Mode Codes on Form 4.x should be "Dependent Mode Initiating Outage" or "Dependent Mode Outage".

If not Event Type Number 11 or 13, then proceed with Step N4 below.

Note: for a given Event ID code, each Automatic Outage on Form 4.x has one of the following Outage Mode Codes.

- Single Mode Outage
- Dependent Mode Initiating Outage
- Dependent Mode Outage
- Common Mode Outage
- Common Mode Initiating Outage

Step N4 – Screen for Event Type Number 31

- If two or more Automatic Outages of TADS adjacent AC Circuits or DC Circuits were the direct result of the Elements occupying common structures, enter Event Type Number 31.
- If not Event Type Number 31, then proceed with Step N5 below.

Step N5 – Screen for Event Type Number 49 – Other Normal Clearing

- If the Event included other Normal Clearing not covered by Event Type Number 05 to 31, enter Event Type Number 49.

Examples of an Event Type Number 49:

Event Type Number 49 includes, but is not limited to, Normal Clearing of two or more NCCBS. For example, an airplane crash causes Automatic Outages of two AC Circuits on a common right-of-way. Both circuits trip as expected with Normal Clearing. Event Type Number 49 should be used for such an event.

Event Type Number 49 also includes additional Automatic Outages with Normal Clearing that are initiated by SPS, RAS, Under Voltage Load Shedding (UVLS), Under Frequency Load Shedding (UFLS), etc.

Step A1 - Abnormal Clearing

- Did Abnormal Clearing occur? (Refer to examples in Step N1.)
  - Yes – Proceed with Step A2.
  - No – Return to Step N1.

Step A2 – Screen for Event Type Number 60; Breaker Failure

- Among the relay targets associated with this Event, did a breaker failure relay operation occur for one or more circuit breakers? Did this time-delayed relay operate as intended? If the answer to both of these questions is yes, enter Event Type Number 60. If one or more Automatic Outages experienced Delayed Clearing due to one or more circuit Breaker Failures (BF), enter Event Type Number 60. If the BF relay scheme did not operate as intended, go to Step A3 below.

  Such delayed clearing examples include, but are not limited to, a circuit breaker being stuck, or slow to open, or failure to interrupt current. Such failures usually cause a circuit BF time-delayed relay to operate. Therefore, a BF relay target also occurs.

- If not Event Type Number 60, then proceed with Step A3 below.

Step A3 – Screen for Event Type numbers 61 and 62; Dependability or Security Failures

- Dependability (failure to operate); If one or more Automatic Outages experienced delayed clearing due to a Dependability failure to operate, enter Event Type Number 61.

  A Dependability failure includes, but is not limited to, a failure of the Composite Protection System to:

  - initiate the isolation of a faulted power system Element, or
  - failure to operate within its designed operating time, or

- Failure to operate as intended for non-fault conditions within its designed operating time.
- Security (false or undesirable operations): If one or more Automatic Outages are caused by a Security failure, enter Event Type Number 62.

  A Security failure includes improper operation of a Protection System (or its controls):

  - in absence of a fault on the power system TADS Element, or
  - during a fault it is not designed to protect.

- If not Event Type Number 60, 61 or 62 then proceed with Step A4 below.

Step A4 – Screen for Event Type Number 90; Other Abnormal Clearing

- If the Event included other Abnormal Clearing not covered by Event Type Number 60, 61 or 62, enter Event Type Number 90.

Example of an Event Type Number 90

Event Type Number 90 includes, but is not limited to, additional Automatic Outages with Abnormal Clearing that are initiated by SPS, RAS, UVLS, UFLS, etc. It also includes Abnormal Clearing of multiple faults or failures that are not covered by Event Type Number 60 to 62.

For additional examples for determining the Event Type Number for Normal Clearing and Abnormal Clearing Events, see Error! Reference source not found. – Detailed Automatic Outage Data examples.

Outage Mode Codes

The Outage Mode Code describes whether an Automatic Outage is related to other Automatic Outages.

Single Mode Outage

An Automatic Outage of a single Element that occurred independent of any other Automatic Outages (if any).

Dependent Mode Initiating Outage

An Automatic Outage of a single Element that initiates one or more subsequent Element Automatic Outages.

Dependent Mode Outage

An Automatic Outage of an Element that occurred because of an initiating outage, whether the initiating outage was an Element outage or a non-TADS Element outage. (Note: to re-emphasize, a Dependent Mode Outage must be a result of another outage.)

Common Mode Outage

One of two or more Automatic Outages with the same Initiating Cause Code and where the outages are not consequences of each other and occur nearly simultaneously (i.e., within cycles or seconds of one another).

Common Mode Initiating Outage

A Common Mode Outage that initiates one or more subsequent Automatic Outages.

Dependent Mode and Common Mode Outage Examples

- **Example 1** - A Dependent Mode Outage involves two or more outages, but one of the outages can be a non-TADS Element outage. Therefore, not all Dependent Mode Outages will have an associated Dependent Mode Initiating Outage. If the initiating outage is one of the four defined Elements, that outage will be a Dependent Mode Initiating Outage, and the resulting second Element outage will be a Dependent Mode Outage. For example, suppose a 500 kV AC Circuit is outaged because of a 500/230 kV Transformer outage. The AC Circuit outage is a Dependent Mode Outage, and the Transformer outage is a Dependent Mode Initiating Outage. However, if an outage is not initiated by an Element, it will not have an associated Dependent Mode Initiating Outage. If the Transformer in the previous example had been a 345/68 kV Transformer and the AC Circuit a 345 kV circuit, the Transformer would not be an Element and, therefore, the AC Circuit outage would not have an associated Dependent Mode Initiating Outage. The AC Circuit outage would be classified as a Dependent Mode Outage since it was the result of a non-TADS Element outage.
- **Example 2** - A Common Mode Outage involves two or more outages, but unlike a Dependent Mode Outage, all outages must be Elements. In addition, one outage must not cause the other outage(s) to occur; i.e., the outages are not consequences of each other. In addition, they must occur nearly simultaneously.
  - As an example, suppose that lightning strikes two AC Circuits in the same right of way (but not necessarily on a common structure) and both circuits are outaged nearly simultaneously. Assume no further outages occur. Both are Common Mode Outages.
  - Now assume the same scenario with a slight difference: one AC Circuit clears normally, the second AC Circuit does not, and there is a circuit breaker failure, resulting in the outage of two additional AC Circuits. The first AC Circuit outage is a Common Mode Outage. The second AC Circuit outage is a Common Mode Initiating Outage, with the two additional AC Circuit outages are both Dependent Mode Outage (if it had only been one additional outage it would also have been Dependent Mode).

Automatic Outage Cause Code Types

Initiating Cause Code
The Automatic Outage Cause Code that describes the initiating cause of the outage.

Sustained Cause Code
The Automatic Outage Cause Code that describes the cause that contributed to the longest duration of the outage. Momentary Outages do not have a Sustained Cause Code.

Initiating and Sustained Cause Code Examples

- **Example 1** - Suppose a lightning strike on an AC Circuit that should have cleared normally becomes a Sustained Outage because of breaker failure. "Lightning" is the Initiating Cause Code and "Failed AC Substation Equipment" is the Sustained Cause Code.
- **Example 2** - Wind causes galloping on a conductor resulting in a circuit lockout. Several hours pass before the circuit can be patrolled to determine whether there was any damage. After patrolling, no damage was found and the circuit was successfully re-energized. "Weather, excluding lightning" is the Initiating Cause Code as well as the Sustained Cause Code.
- **Example 3** - A Tornado passes through and fails a wood pole structure bringing it to the ground. The line is outaged for 57 hours before it can be returned to an in-service state. Weather, excluding lightning is the initiating cause code and Failed AC Circuit Equipment is the Sustained Cause Code.

How to interpret "contributed to the longest duration"
To illustrate the meaning of the phrase "contributed to the longest duration" in the definition above, suppose that lightning caused a conductor to break ("Failed AC Circuit Equipment") and that the breaker for the circuit failed ("Failed AC Substation Equipment'). This example has two possible Sustained Cause Codes, and the one to select is the one that contributed to the longest duration. If the conductor was repaired before the circuit breaker, then "Failed AC Substation Equipment" is the Sustained Cause Code since the circuit breaker outage contributed to the longest duration. However, if the circuit breaker was repaired before the conductor, then "Failed AC Circuit Equipment" is the Sustained Cause Code.

Automatic Outage Cause Codes
The Automatic Outage Cause Code describes the cause with respect to location on the power system it occurred. (See Outage Initiation Code for location on the power system)

Weather, excluding lightning
Automatic Outages caused by weather such as snow, extreme temperature, rain, hail, fog, sleet/ice, wind (including galloping conductor), tornado, microburst, dust storm, and flying debris caused by wind.

Lightning
Automatic Outages caused by lightning.

Environmental
Automatic Outages caused by environmental conditions such as earth movement (including earthquake, subsidence, earth slide), flood, geomagnetic storm or avalanche.

Contamination
Automatic Outages caused by contamination such as bird droppings, dust, corrosion, salt spray, industrial pollution, smog or ash.

Foreign Interference

Automatic Outages caused by foreign interference from such objects including an aircraft, machinery, a vehicle, a train, a boat, a balloon, a kite, a bird (including streamers), an animal, flying debris not caused by wind, and when falling conductors from another line cause a fault and result in an outage.

Foreign Interference is not due to an error by a utility employee or contractor. Categorize these as "Human Error."

Fire

Automatic Outages caused by fire or smoke.

Vandalism, Terrorism or Malicious Acts

Automatic Outages caused by intentional activity such as shot conductors or insulators, removing bolts from structures, and bombs.

The above definition includes intentional malicious acts such as cyber-attacks. However, accidental acts initiated by any incorrect action traceable to employees and/or contractors for companies operating, maintaining, and/or providing assistance to the Transmission Owner should be cause coded as "Human Error".

Failed AC Substation Equipment

Automatic Outages caused by the failure of AC Substation; i.e., equipment "inside the substation fence" including Transformers and circuit breakers but not Protection System equipment as it is not part of the AC Substation. Refer to the definition of "AC Substation."

For TADS reporting when an instrument transformer failure results in a BES fault on the primary system it should be reported as failed AC substation equipment.

Failed AC/DC Terminal Equipment

Automatic Outages caused by the failure of AC/DC Terminal equipment; i.e., equipment "inside the terminal fence" including PLC (power-line carrier) filters, AC filters, reactors and capacitors, Transformers, DC valves, smoothing reactors, and DC filters but not Protection System equipment as it is not part of the DC Terminal. Refer to the definition of "AC/DC Terminal."

Failed Protection System Equipment

Automatic Outages caused by the failure of devices which are part of a Protection system as defined in the NERC Glossary of Terms. Includes any relay and/or control misoperations, *except* those that are caused by incorrect relay or control settings that do not coordinate with other protective devices. Categorize these as "Human Error".

Automatic Outages caused by the failure of a protective device which is not part of the NERC defined Protection system should be coded as Failed AC Substation Equipment and NOT Failed Protection System Equipment.

For TADS reporting when an instrument transformer has a failure on the secondary system it should be reported as failed protection system equipment.

Failed AC Circuit Equipment

Automatic Outages related to the failure of AC Circuit equipment, i.e., overhead or underground equipment "outside the substation fence." Refer to the definition of "AC Circuit."

Failed DC Circuit Equipment

Automatic Outages related to the failure DC Circuit equipment, i.e., overhead or underground equipment "outside the terminal fence." Refer to the definition of "DC Circuit." However, include the failure of a connecting DC bus within an AC/DC Back-to-Back Converter in this category.

Vegetation

Automatic Outages (both Momentary and Sustained) caused by vegetation, with the exception of the following exclusions, which are contained in FAC-003-X:

1. Vegetation-related outages that result from vegetation falling into lines from outside the right of way that result from natural disasters shall not be considered reportable with the Vegetation Cause Code. Examples of disasters that could create non-reportable Vegetation Cause Code outages include, but are not limited to, earthquakes, fires, tornados, hurricanes, landslides, wind shear, fresh gale, major storms as defined either by the Transmission Owner or an applicable regulatory body, ice storms, and floods.
2. Vegetation-related outages due to human or animal activity shall not be considered reportable under the Vegetation Cause Code. Examples of human or animal activity that could cause a non-reportable Vegetation Cause Code outage include, but are not limited to, logging, animal severing tree, vehicle contact with tree, or removal or digging of vegetation.

Outages that fall under the exclusions should be reported under another Cause Code and not the Vegetation Cause Code. Instances where the Initiating Cause Code is not Vegetation, the Sustained Cause Code would also not be Vegetation.

Vegetation outages reported under FAC-003-X would be expected to be reported with the Vegetation Cause Code in TADS.

Power System Condition

Automatic Outages caused by power system conditions such as instability, overload trip, out-of-step, abnormal voltage, abnormal frequency, or unique system configurations (e.g., an abnormal terminal configuration due to existing condition with one breaker already out of service).

Human Error

Automatic Outages caused by any incorrect action traceable to employees and/or contractors for companies operating, maintaining, and/or providing assistance to the Transmission Owner will be identified and reported in this category. In addition, any human failure or interpretation of standard industry practices and guidelines that cause an outage will be reported in this category.

Unknown

Automatic Outages caused by unknown causes should be reported in this category.

Other

Automatic Outages for which the cause is known; however, the cause is not included in the above list.

Operational Outage Cause Codes

Emergency

Use for Operational Outages that are taken for the purpose of avoiding risk to human life, damage to equipment, damage to property, or similar threatening consequences.

System Voltage Limit Mitigation

Use for Operational Outages taken to maintain the voltage on the transmission system within desired levels (i.e., voltage control).

System Operating Limit Mitigation, excluding System Voltage Limit Mitigation

Use for Operational Outages taken to keep the transmission system within System Operating Limits, except for System Voltage Limit Mitigation. The term "System Operating Limit" is defined in the NERC *Glossary of Terms Used in Reliability Standards* and is excerpted:

System Operating Limit:

The value (such as MW, MVar, Amperes, Frequency or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria. System Operating Limits are based upon certain operating criteria. These include, but are not limited to:

1. Facility Ratings (Applicable pre- and post-Contingency equipment or facility ratings)
2. Transient Stability Ratings (Applicable pre- and post-Contingency Stability Limits)
3. Voltage Stability Ratings (Applicable pre- and post-Contingency Voltage Stability)
4. System Voltage Limits (Applicable pre- and post-Contingency Voltage Limits).

Do not include actions in the last category (System Voltage Limits) since this is included in the previous "System Voltage Limitation" code.

Human Error

Use for manual switching errors and any operation that is caused by personnel during on-site maintenance, testing, inspection, construction, or commissioning activities.

- **Example 1** - An employee intends to open breaker 1 to outage circuit A. However, he operates the wrong control handle and opens breaker 3 and outages circuit B.
- **Example 2** - An employee is testing a relay and, as a result, unintentionally operates a breaker, placing the circuit into a not In-Service State. This would also include interruptions when an electrician is working in the switchhouse and accidently shorts out a circuit and trips a breaker.

Other Operational Outage

Use for Operational Outages for reasons not included in the above list.