

# NERC

NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

# Outage Types

## Automatic vs Operational

## Sustained vs Momentary

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RELIABILITY | RESILIENCE | SECURITY



# **Momentary Outage vs Sustained Outage**

- **Momentary Outage** : An Automatic Outage with an Outage Duration less than one (1) minute. If the circuit recloses and trips again within less than a minute of the initial outage, it is only considered one outage. The circuit would need to remain in service for longer than one minute between the breaker operations to be considered as two outages. Only 200kV and above Elements have reportable momentary outages.
  - Example 1: Lightning causes a two terminal line to trip. One terminal recloses successfully, the Transmission Operator must manually reclose the remote end. This is completed successfully at 53 seconds following the trip. This would be considered a Momentary Outage.
  - Example 2: Lightning causes a two terminal line to trip. Both terminals automatically reclose successfully. After 25 seconds, a new Lightning strike occurs and trips the line a 2<sup>nd</sup> time. Following the 2<sup>nd</sup> trip, both terminals again reclose successfully. This is considered a single momentary outage for NERC TADS reporting<sup>(1)</sup>.

**In both cases, the line must be returned to its pre-trip In-Service State to end the outage. The outage doesn't end when one terminal is closed.**

(1) From the perspective of NERC TADS reporting, this is considered a single momentary outage. This may require reporting as two separate events under other programs or processes.

- **Sustained Outage<sup>(2)</sup>:** An Automatic Outage with an Outage Duration of a minute or greater.
  - Example 1: A Tree falls on a two terminal line and both ends trip and lock out. It takes a tree crew 24 hours to respond and remove the tree. This is a sustained outage.
  - Example 2: Lightning strikes a two terminal line and both ends trip. One terminal successfully auto recloses. The second terminal fails to auto reclose. The Transmission Operator is able to manually reclose the line 4 minutes after the trip. This is considered a sustained outage.

**In both cases, the line must be returned to its pre-trip In-Service State to end the outage. The outage doesn't end when one terminal is closed.**

(2) The TADS definition of Sustained Outage is different from the NERC *Glossary of Term Used in Reliability Standards* definition of Sustained Outage that is presently only used in FAC-003-1. The glossary defines a Sustained Outage as: "The deenergized condition of a transmission line resulting from a fault or disturbance following an unsuccessful automatic reclosing sequence and/or unsuccessful manual reclosing procedure." The definition is inadequate for TADS reporting for two reasons. First, it has no time limit that would distinguish a Sustained Outage from a Momentary Outage. Second, for a circuit with no automatic reclosing, the outage would not be "counted" if the TO has a successful manual reclosing under the glossary definition.

# **Automatic Outages Form 4.X**

- An outage that results from the automatic operation of a switching device, causing an Element to change from an In-Service State to a not In-Service State.
  - Single-pole tripping followed by successful AC single-pole (phase) reclosing is not an Automatic Outage.

**Table I.1: TADS Outage Collection by Voltage Class**

Voltage Class	Automatic Outages		Non-automatic Outages	
	Sustained	Momentary	Planned	Operational
0-199 kV	Yes	No	No	No
200 kV and Above	Yes	Yes	No	Yes

Data Collected for Automatic Outages is as follows:

**Table 4.1: Data for Elements That Had an Automatic Outage**

Column	Forms 4.1-4.4 Descriptor
A	The Outage ID Code assigned to the outage. This is assigned by the TO. See <b>Appendix A</b> for the definition of Outage ID Code. For any given TO, over multiple years, webTADS requires the TO entered Form 4.x Outage ID to be used only once on an Automatic Outage (on Form 4.x).
B	The Event ID Code associated with the outage. This is assigned by the TO on Form 5.0. See <b>Appendix A</b> for the definition of Event ID Code. The Event ID Code used on Form 4.x must be pre-defined on Form 5.0.
C	A TO defined unique Element Identifier. See column A in Table 3.1 for details.
<p>The descriptions that follow use defined terms that the TO should become familiar with. Definitions of defined terms are located in <b>Appendix A</b> and they will not be repeated here. Most data fields have drop-down menus. They each describe various facets of the outage.</p>	
D	The Fault Type (if any) for each circuit Outage, input from a drop-down menu.

**Table 4.1: Data for Elements That Had an Automatic Outage**

Column	Forms 4.1-4.4 Descriptor
E	The Outage Initiation Code, input from a drop-down menu.
F	The Outage Start Time. This may be local time or UTC time. WebTADS will offer a choice of time zones, with UTC being the default. This applies whether the data is entered directly into webTADS or bulk-uploaded via XML files (created either from an Excel workbook or directly by the TO). WebTADS will convert all non-UTC times to UTC and store the time as UTC within webTADS.
G	The Outage Time Zone. The Time Zone of the reported Outage.
H	The Outage Duration expressed as hours and minutes. Momentary Outages will enter a “0” (zero). A zero entry in column M tells the reviewer that the outage was Momentary. See instructions in Section 4.1 below for outages that continue beyond the end of the reporting year. Note that the format is a text field and requires a colon (“:”) be entered between the hours and minutes. Enter 860 hours and 20 min. as 860:20. <i>If the colon is absent, the entry will be interpreted as “hours.”</i> If the Outage Duration exceeds the number of hours remaining in the year (based upon the Outage Start Time), the data will be rejected and an error notice provided. If the previous entry of “860:20” were entered as 86020, it would be read as 86,020 hours and rejected.

**Table 4.1: Data for Elements That Had an Automatic Outage**

Column	Forms 4.1-4.4 Descriptor
I	The Initiating Cause Code, input from a drop-down menu. All Outages must supply an Initiating cause code.
J	The Sustained Cause Code, input from a drop-down menu. This only applies to Sustained Outages. For Momentary Outages, enter “NA-Momentary.”
K	The Outage Mode, input from a drop-down menu.
L	<p>The Outage Continuation Flag described whether the outages started and ended within the reporting year or not. The flag is explained in a footnote on the data form as well as in <b>Appendix A</b> where the term is fully defined.</p> <p>Outages that span across quarters in the same year should not use this flag. Instead, TOs should update the outage duration during each quarter until the outage ends.</p>

# **Operational Outages Form 6.X**

- A Non-Automatic Outage for the purpose of avoiding an emergency (.e., risk to human life, damage to equipment, damage to property) or to maintain the system within operational limits and that cannot be deferred.
  - Includes Non-Automatic Outages resulting from manual switching errors.
  - Planned Outages are not Reportable to TADS

**Table I.1: TADS Outage Collection by Voltage Class**

Voltage Class	Automatic Outages		Non-automatic Outages	
	Sustained	Momentary	Planned	Operational
0-199 kV	Yes	No	No	No
200 kV and Above	Yes	Yes	No	Yes

Data Collected for Operational Outages is as follows:

**Table 6.1: Data for Elements That Had an Automatic Outage**

Column	Forms 6.1-6.4 Descriptor
A	The Outage ID Code assigned to the outage. This is assigned by the TO. See <b>Appendix A</b> for the definition of Outage ID Code. For any given TO, over multiple years, webTADS requires the TO entered Form 4.x Outage ID to be used only once on an Automatic Outage (on Form 4.x).
B	A TO defined unique Element Identifier. Element Identifiers cannot be reused in any future reporting period for a different Element. If there are multiple owners of the Element, those TOs must agree on the Element Identifier.
C	Non-Automatic Outage Type. Please refer to <b>Appendix A</b> for the definition of Non-Automatic Outage Types.
The descriptions that follow use defined terms that the TO should become familiar with. They will not be repeated here. Most data fields have drop-down menus. They each describe various facets of the outage.	
D	The Outage Start Time. This may be local time or UTC time. WebTADS will offer a choice of time zones, with UTC being the default. This applies whether the data is entered directly into webTADS or bulk-uploaded via XML files (created either from an Excel workbook or directly by the TO). WebTADS will convert all non-UTC times to UTC and store the time as UTC within webTADS.

**Table 6.1: Data for Elements That Had an Automatic Outage**

Column	Forms 6.1-6.4 Descriptor
E	The Outage Time Zone. The Time Zone of the reported Outage.
F	The Outage Duration expressed as hours and minutes. Momentary Outages will enter a “0” (zero) in this field since we round to the nearest minute. A zero entry in column M tells the reviewer that the outage was Momentary. See instructions in Section 4.1 below for outages that continue beyond the end of the reporting year. Note that the format is a text field and requires a colon (“:”) be entered between the hours and minutes. Enter 860 hours and 20 min. as 860:20. <i>If the colon is absent, the entry will be interpreted as “hours.”</i> If the Outage Duration exceeds the number of hours remaining in the year (based upon the Outage Start Time), the data will be rejected and an error notice provided. If the previous entry of “860:20” were entered as 86020, it would be read as 86, 020 hours and rejected.
G	Operational Outages enter “NA”.
H	The Operational Cause Code, input from a drop-down menu. This only applies to Operational Outages.
I	The Outage Continuation Flag described whether the outages stated and ended within the reporting year or not. The flag is explained in a footnote on the data form as well as in <b>Appendix A</b> where the term is fully defined.

- **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 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:
  - 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:
    - Facility Ratings (Applicable pre- and post-Contingency equipment or facility ratings)
    - Transient Stability Ratings (Applicable pre- and post-Contingency Stability Limits)
    - Voltage Stability Ratings (Applicable pre- and post-Contingency Voltage Stability)

- **System Voltage Limit Mitigation:** Use for Operational Outages taken to maintain the voltage on the transmission system within desired levels (i.e., voltage control).
  - This also includes actions taken in response to System Voltage Limits (Pre and Post Contingent Voltage Limits)
- **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 accidentally shorts out a circuit and trips a breaker.
- **Other Operational Outage:** Use for Operational Outages for reasons not included in the above list.



# Questions and Answers

[TADS@NERC.NET](mailto:TADS@NERC.NET)