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NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Transmission Availability Data System Reporting Training 101

October 2020

RELIABILITY | RESILIENCE | SECURITY



- TADS 101 Learning Objectives
 - Background
 - In Service State / TADS Reportable
 - Outage Types: Automatic vs Operational and Momentary vs Sustained
 - Cause Codes: Initiating (ICC) and Sustained (SCC)
 - Fault Types
 - Outage Modes
 - Outage ID and Event ID Codes
 - Test your knowledge

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Transmission Availability Data System Reporting Training 101 - Background

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 - Cause Codes: Initiating (ICC) and Sustained (SCC)
 - Fault Types
 - Outage Modes
 - Outage ID and Event ID Codes
 - Test your knowledge

- Short videos:
 - NERC: <https://vimeopro.com/nerclearning/nerc-essentials/video/428527772>
 - TADS: <https://vimeopro.com/nerclearning/introduction-to-tads/video/456215739>

- All NERC registered Transmission Owners (TOs) who own the following Bulk Electric System elements:
 - AC Circuits (Overhead and Underground)
 - Transformers* with ≥ 100 kV secondary voltage
 - AC/DC Back-to-Back Converters
 - DC Circuits (Overhead and Underground)

*Generator Step-up Transformers are excluded from TADS reporting

- Basic Company Information (Forms 1.x)
- Inventory Information (Forms 2.x and 3.x)
- Event Information (Form 5)
- Automatic Outage Information (Forms 4.x)
- Non-Automatic Outage Information (Forms 6.x)





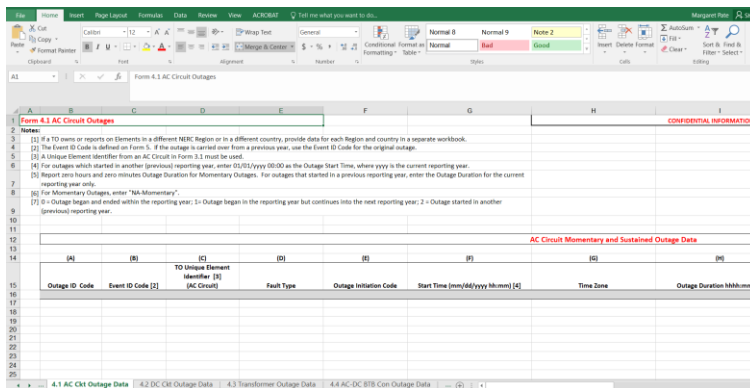
Regional Entity (RE) Contacts

NERC	tads@nerc.net
MRO	Jake Bernhagen
NPCC	Rafael Sahiholamal
RF	John Idzior
SERC	Nick DePompei
Texas RE	tads@texasre.org
WECC	support@wecc.org

- TADS [Website](#)
- The menu provides useful information such as
 - TADS News,
 - Regional contacts,
 - TADS Data Reporting Instructions (DRI),
 - Related Links, and
 - Dashboards

- Always check the NERC website for the most recent versions!!
- TADS DRI
- TADS Bulk Upload Workbook

TADS Data Reporting Instructions (DRI)		
Type	Title	Date
webTADS Application Updates (6)		
Key TADS Documents (2)		
	2020 TADS DRI	1/1/2020
	TADS Reporting Workbook	8/26/2020



The screenshot shows a Microsoft Excel spreadsheet titled "Form 4.1 AC Circuit Outages". It contains instructions for reporting outages and a table for data entry. The table has columns for Outage ID Code, Event ID Code, TO Unique Element Identifier (AC Circuit), Fault Type, Outage Initiation Code, Start Time (mm/dd/yyyy hh:mm), Time Zone, and Outage Duration (MM:MM).

Related Links
OATI - How to set up an account
Transmission Availability Data System Working Group (TADSWG)
Training
Data Quality Control Process
TADS Phase II Final Report
TADS Section 1600 Data Request Planned Outages

- Chair: Dan King (Ameren), Vice Chair: John Idzior (RF)
- Group Purpose: Implement a uniform approach to reporting and measuring transmission availability, performance, and other related reliability data. To meet this purpose, the TADSUG makes recommendations on four key subjects:
 1. The type of transmission availability data that TOs report to NERC;
 2. A single process for collecting such data that avoids duplication of effort;
 3. Transmission availability and performance metrics that are calculated from the reported data; and
 4. Guidelines for release of data and metrics.
- Contact tads@nerc.net to be added to the TADSWG mailing list (there is no obligation if you monitor)



Questions and Answers

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In Service State / TADS Reportable

October 2020

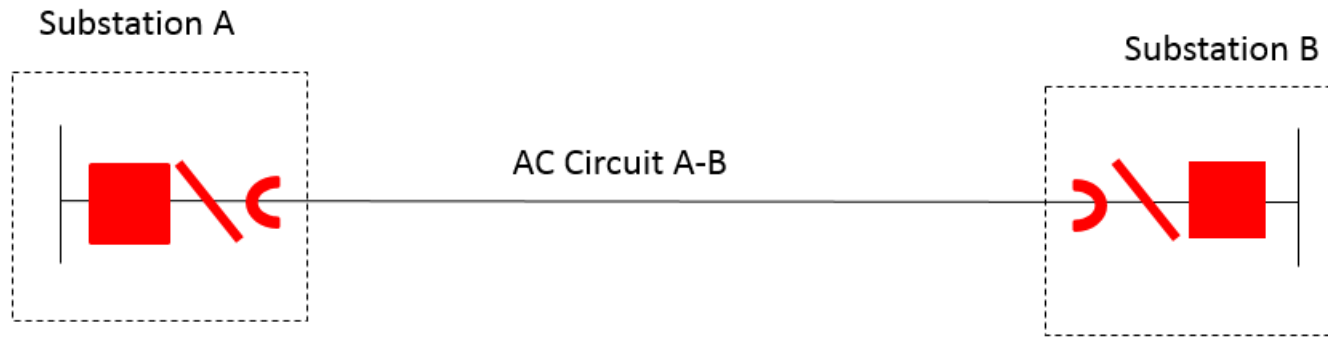
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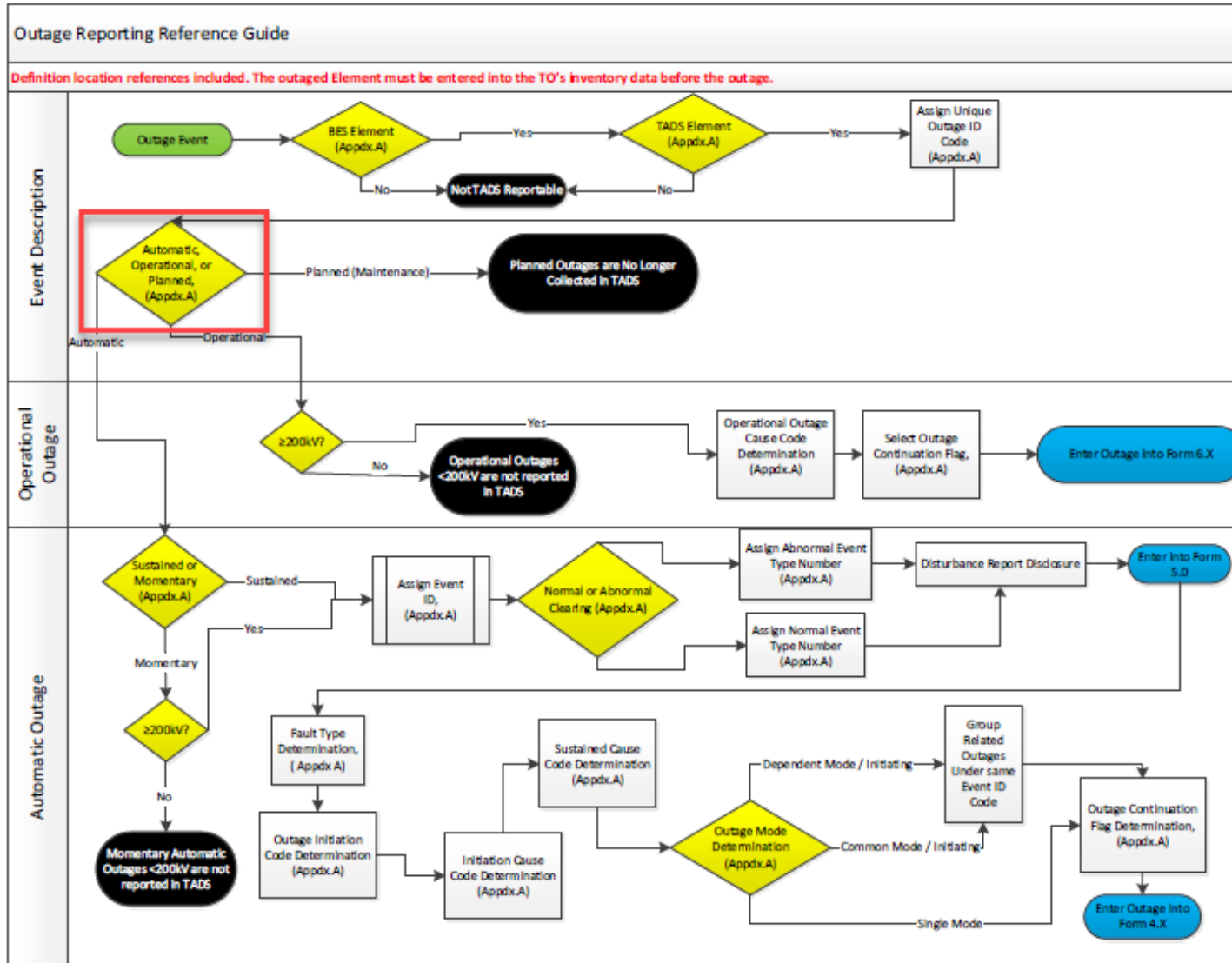
- AC Transformer

- A bank comprised of three single-phase transformers or a single three-phase transformer. A Transformer is bound by its associated switching or interrupting devices.
- Transformer A is bound by the breaker and disconnect switch.
- Transformer A is Not in Service if either the breaker or disconnect switch is open.
- Transformer B is bound by breakers on the high and low side.
- Transformer B is Not in Service if either breaker is open



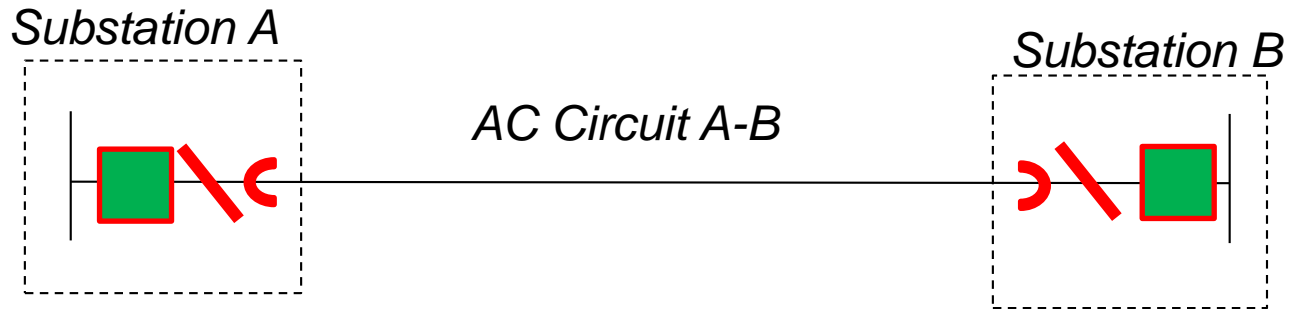
- AC Circuit

- A set of AC overhead or underground three-phase conductors that are bound by AC Substations.
- Note: Radial circuits which are BES elements are to be included in AC Circuits.
- The boundary of an AC Circuit extends to the transmission side of an AC Substation.
- A circuit breaker, Transformer, and their associated disconnect switches are not considered part of the AC Circuit, but they are defined, instead, as part of the AC Substation.



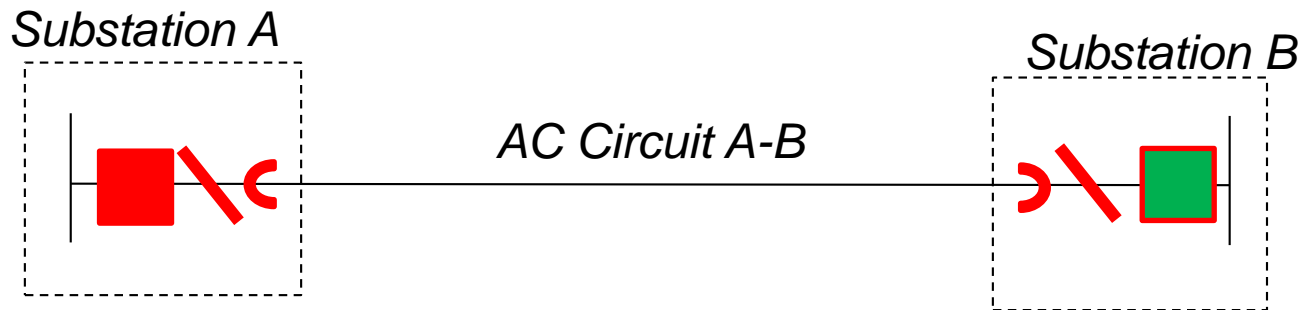
- **Automatic Outage:**
 - An outage that results from the automatic operation of a switching device, causing an Element to change from an In-Service State to a not In-Service State.
 - Single-pole (phase) tripping followed by successful AC single-pole (phase) reclosing is not an Automatic Outage.
- **In-Service State:**
 - An Element that is energized and connected at all its terminals to the system.

- **Momentary Outage:**
 - An Automatic Outage with an Outage Duration less than one 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.
- **Sustained Outage:**
 - An Automatic Outage with an Outage Duration of a minute or greater.

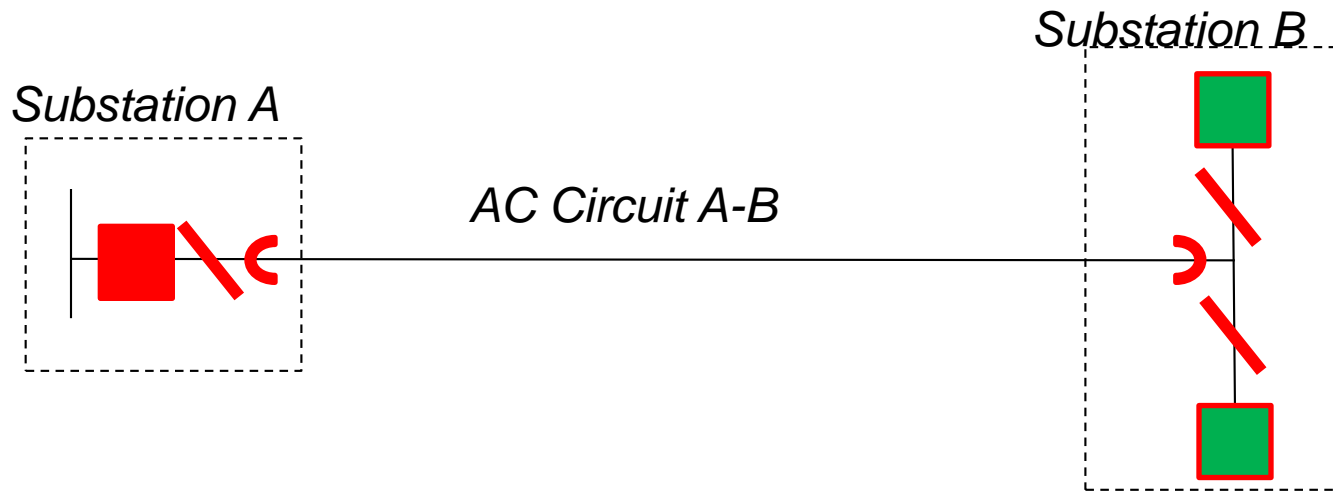


- In Service State

- An Element that is energized and connected at all its terminals to the system .
 - AC Circuit A-B is not in service in this example because it is not energized and it is not connected to terminal A and terminal B

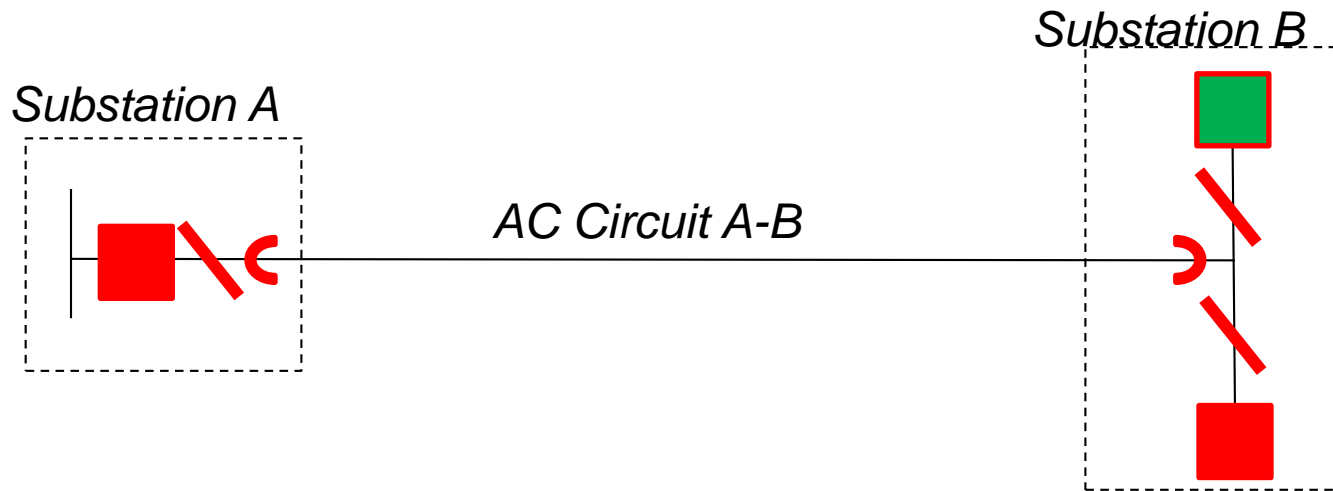


- In Service State
 - An Element that is energized and connected at all its terminals to the system.
 - AC Circuit A-B is not in service in this example because even though it is energized it is not connected at terminal B



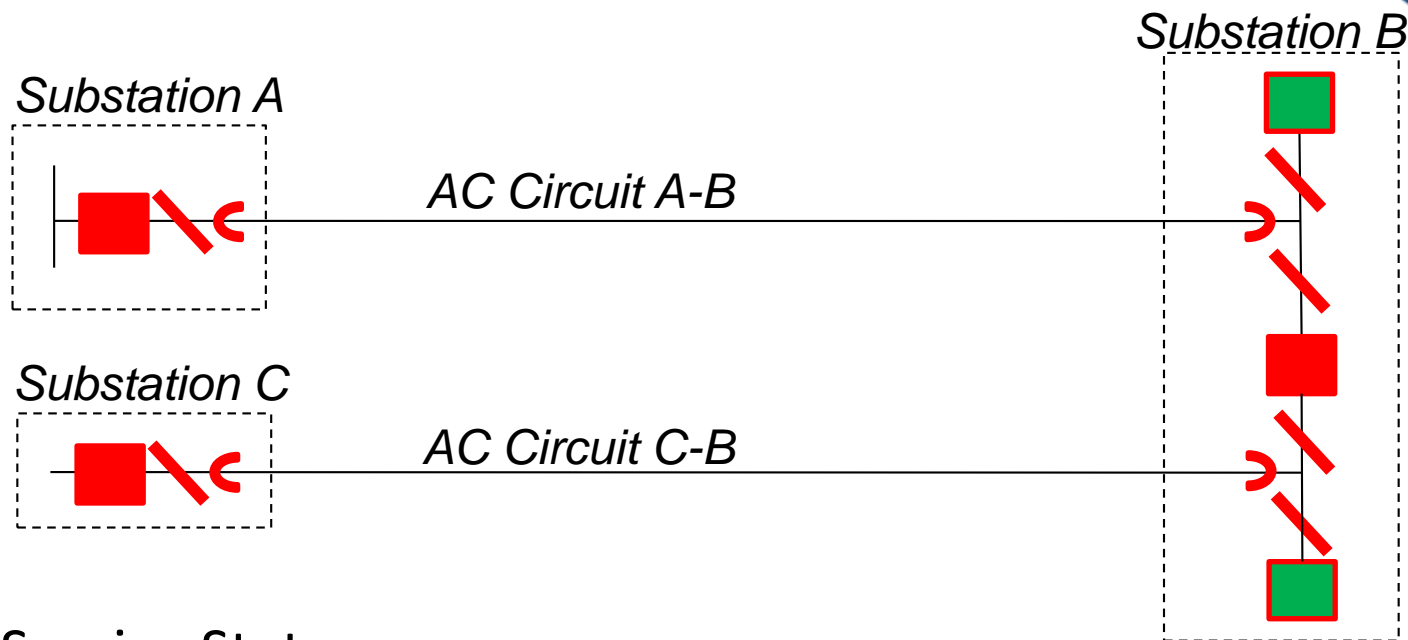
- In Service State

- An Element that is energized and connected at all its terminals to the system.
 - AC Circuit A-B is not in service in this example because even though it is energized it is not connected at terminal B



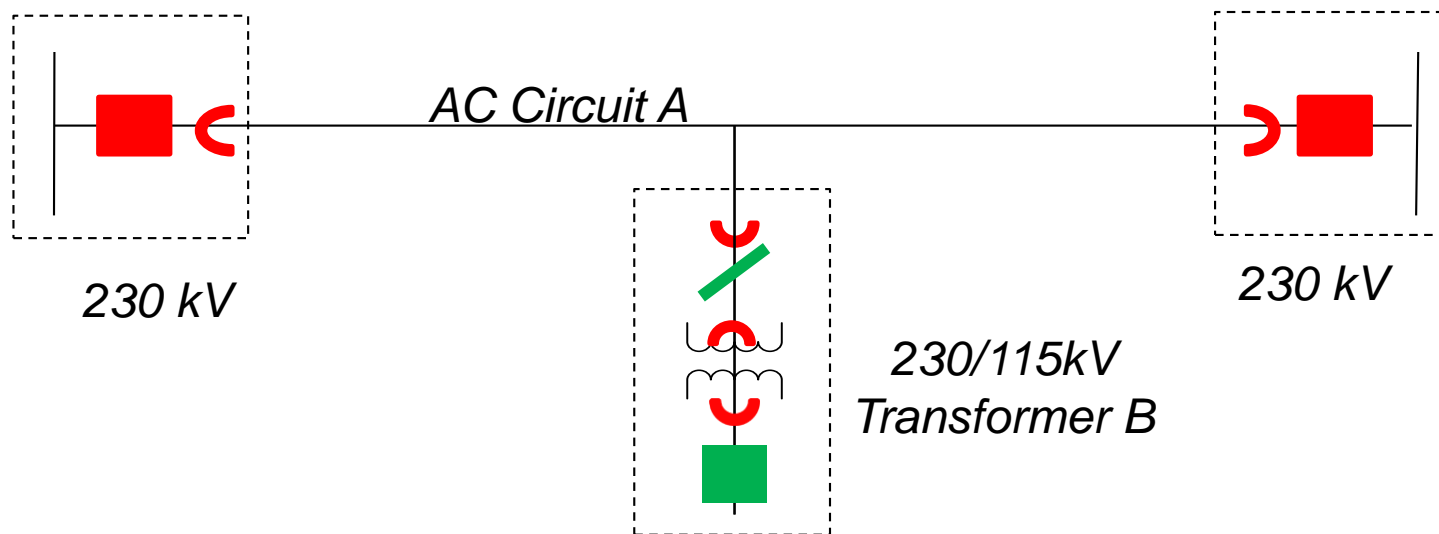
- In Service State

- An Element that is energized and connected at all its terminals to the system.
 - AC Circuit A-B is in service in this example because it is energized and is connected at terminal A and terminal B

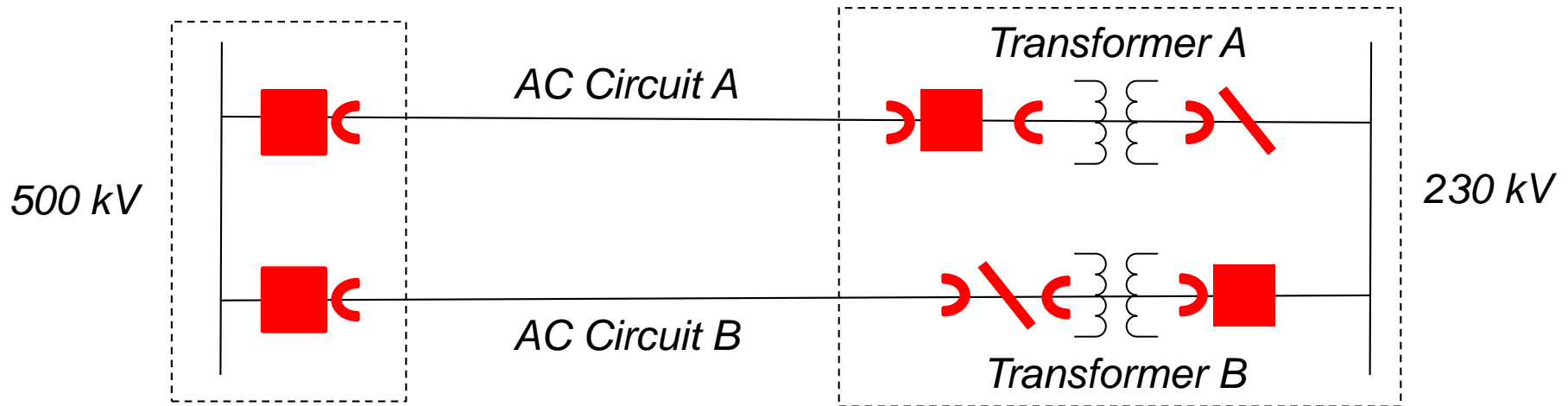


- In Service State

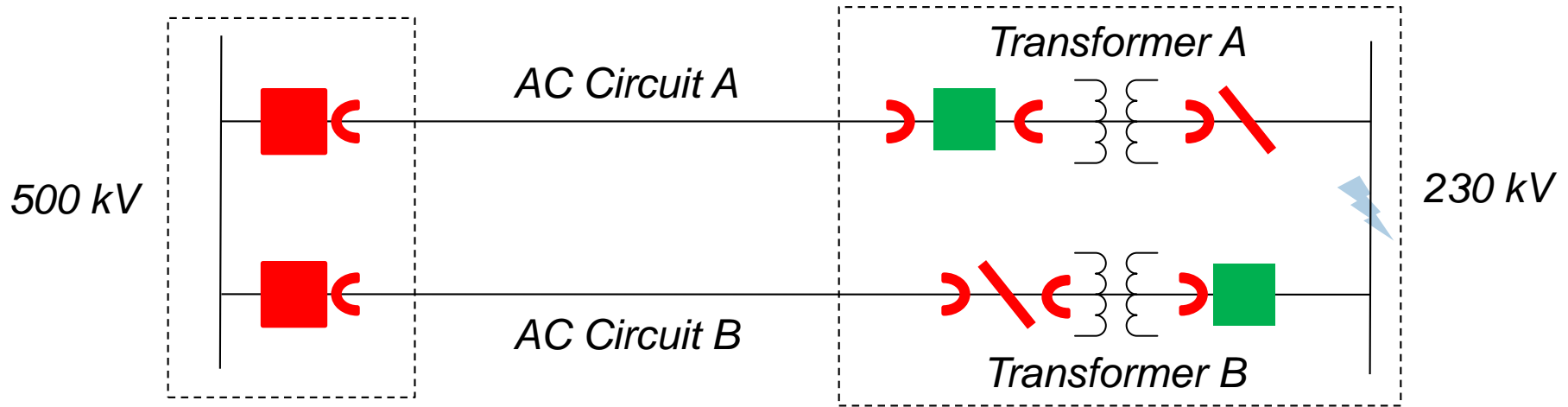
- An Element that is energized and connected at all its terminals to the system.
 - AC Circuit A-B is in service in this example because it is energized and is connected at terminal A and terminal B



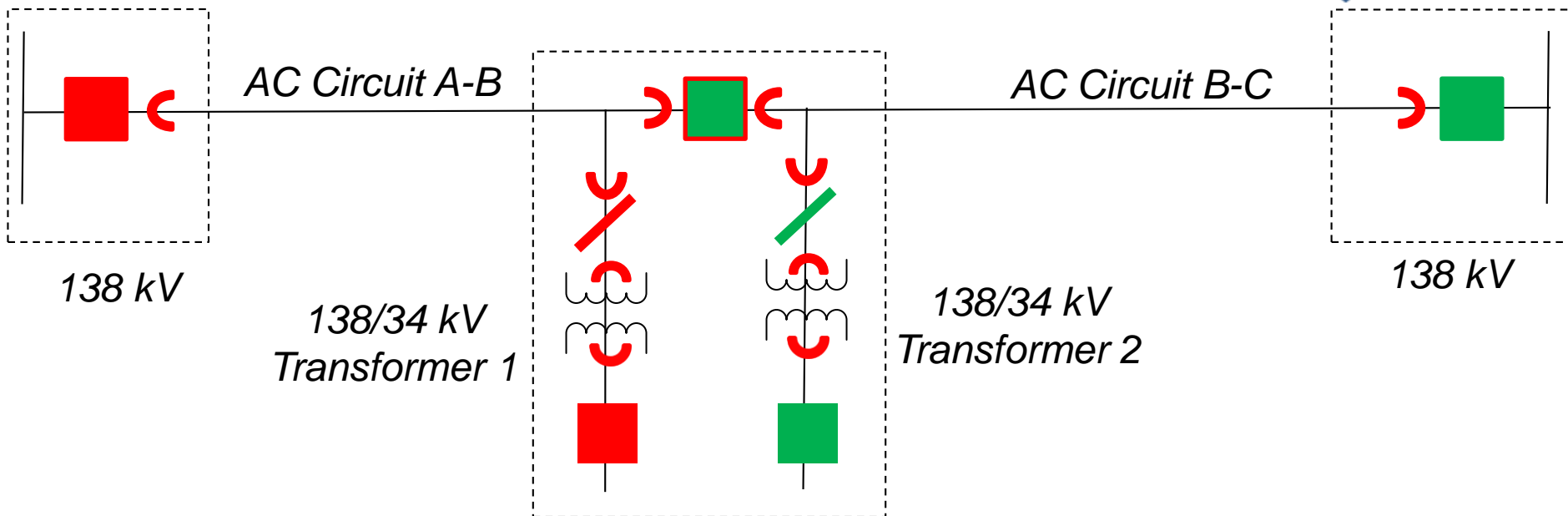
- Transformer B experiences a fault. The fault is interrupted by the breakers on AC circuit A and Transformer B. After the disconnect switch is opened AC Circuit A is automatically restored within a minute.
 - AC Circuit A reports a momentary outage
 - AC Circuit A returns to an in service state per the multi terminal tapped transformer exclusion
 - Transformer B reports an outage - is not in service



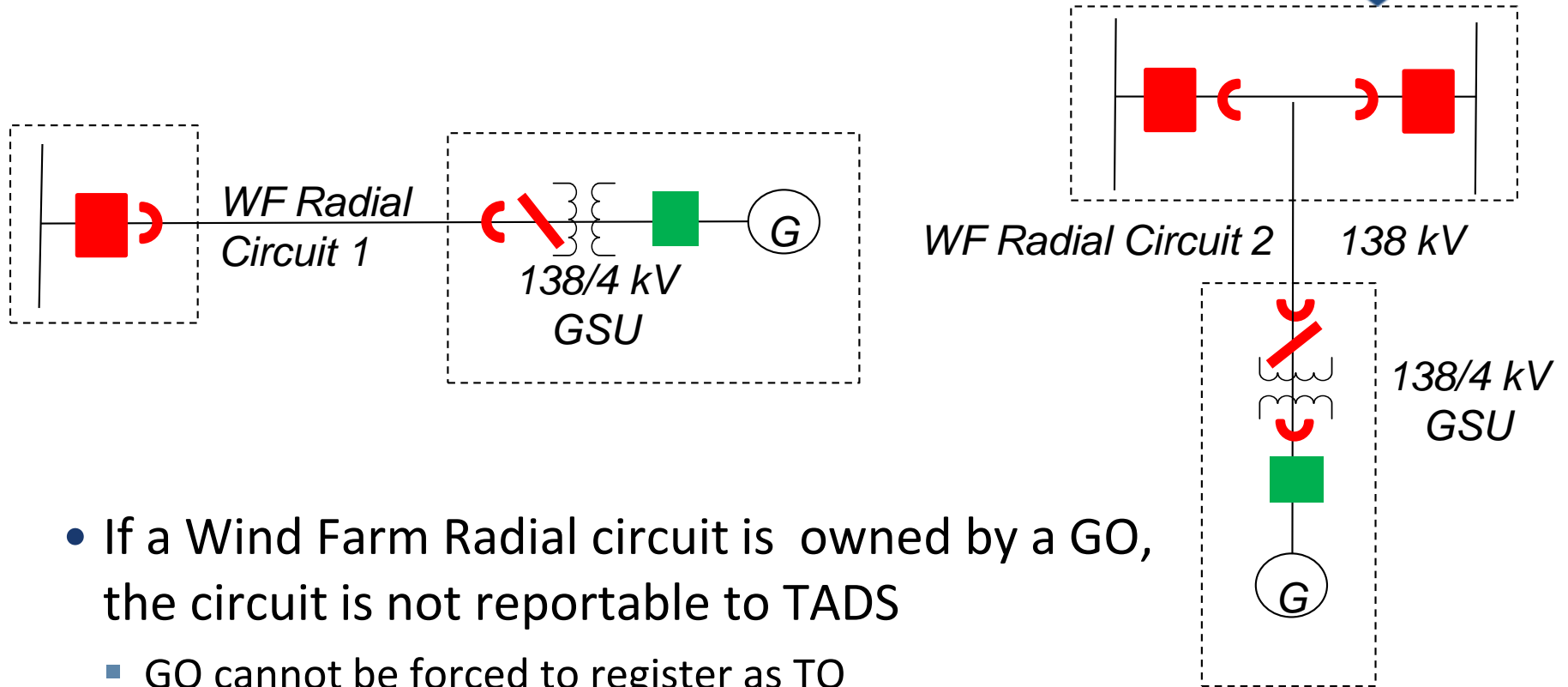
- AC Circuit A is bound by the two breakers
 - Transformer A is bound by a breaker and a disconnect switch
 - AC Circuit B is bound by a breaker and a disconnect switch
 - Transformer B is bound by a breaker and a disconnect switch



- A 230 kV bus fault opens the designated breakers.
 - AC Circuit A reports an outage – one terminal is disconnected
 - Transformer A reports an outage – both terminals are disconnected
 - AC Circuit B DOES NOT report an outage – both terminals are connected
 - Transformer B reports an outage – one terminal is disconnected



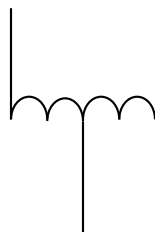
- AC Circuit A-B and AC Circuit B-C Report an outage
 - AC Circuit B-C is not energized or connected at terminal B or terminal C
 - AC Circuit A-B is energized, but is not connected at terminal B



- If a Wind Farm Radial circuit is owned by a GO, the circuit is not reportable to TADS
 - GO cannot be forced to register as TO
- WF Radial Circuit 1 and WF Radial Circuit 2 are in service in these examples

Do I report my transformer based off of low side or high side?

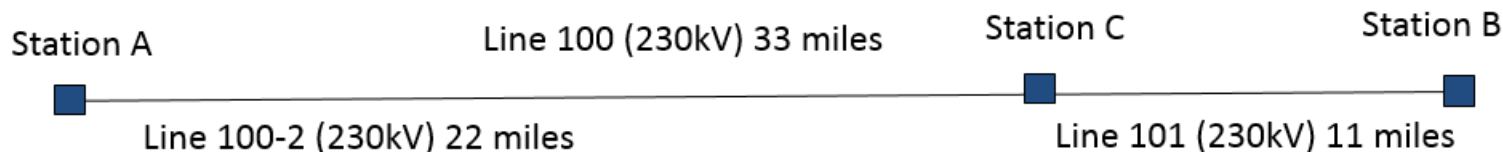
- Transformers are classified as TADS reportable based on their lower or secondary voltage classification. Transformers with secondary or lower winding voltages greater than 100kV, or are included in the BES through the inclusion criteria are reportable.
- Once a transformer has been classified as reportable, it is entered into the inventory based on its high side or primary winding voltage class.



- Examples:

- A 500kV to 230kV transformer would be entered into TADS as a 400-599kV
- A 500kV to 138kV transformer would be entered into TADS as a 400-599kV
- A 500kV to 765kV transformer would be entered into TADS as a 600-799kV
- A 345kV to 69kV transformer would not be reported into TADS

- If I cut circuit 100 to make a new circuit 100 (relabeled as 100-2 for TADS reporting) & new circuit 101 what is the process?



Element Identifier	From Bus	To Bus	Length	In Service Date	Retirement Date	Precursor
100	Station A	Station B	33.0	2/29/2012	11/2/2017	
100-2	Station A	Station C	22.0	12/5/2017		100
101	Station B	Station C	11.0	12/7/2017		100

A stylized map of North America, including the United States, Canada, and Mexico. The map is rendered in shades of blue and grey. A horizontal band of medium blue color passes behind the map, serving as a background for the title text.

Questions and Answers

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Outage Types

Automatic vs Operational

Sustained vs Momentary

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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 2nd time. Following the 2nd trip, both terminals again reclose successfully. This is considered a single momentary outage for NERC TADS reporting⁽¹⁾.

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⁽²⁾**: 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 Appendix A 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 Appendix A 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.
The descriptions that follow use defined terms that the TO should become familiar with. Definitions of defined terms are located in Appendix A and they will not be repeated here. Most data fields have drop-down menus. They each describe various facets of the outage.	
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 Appendix A 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 Appendix A 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 Appendix A 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.
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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 Appendix A 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.

A stylized map of North America, including the United States, Canada, and Mexico. The map is rendered in shades of blue and grey. A horizontal band of medium blue color passes behind the map, serving as a background for the title text.

Questions and Answers

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Outage Initiation Codes

October 2020

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- This is not the Initiating cause code
- The Outage Initiation Codes describe where an Automatic Outage was initiated on the power system.
 - Element-Initiated Outage
 - An Automatic Outage of a TADS Element that is initiated on or within the TADS Element that is outaged.
 - Other Element-Initiated Outage
 - An Automatic Outage of an TADS Element that is initiated by another TADS Element and not by the TADS Element that is outaged. (Note: Only used for TADS Elements)
 - AC Substation-Initiated Outage
 - An Automatic Outage of a TADS Element that is initiated on or within AC Substation facilities. (Note: By the definition of “AC Substation” in Section A, Protection System Equipment is not part of the AC Substation; it is therefore included in “Protection System-Initiated Outage.” Only used for TADS Element.)

- **AC/DC Terminal-Initiated Outage**
 - An Automatic Outage of a TADS Element that is initiated on or within AC/DC Terminal facilities. (Note: By the definition of “AC/DC Terminal” in Section A, Protection System Equipment is not part of the DC Terminal; it is therefore included in “Protection System-Initiated Outage.” Only used for TADS Element.)
- **Protection System-Initiated Outage**
 - An Automatic Outage of a TADS Element that is initiated on or within the Protection System. (Note: This includes Automatic Outages due to the failure of a Protection System element initiated by protection equipment (including, but not limited to: incorrect protection settings, wiring errors, miscoordination, Protection System related Human Error, etc.) causing the protection system to misoperate. Only used for TADS Element.)
- **Other Facility-Initiated Outage**
 - An Automatic Outage that is initiated on or within other facilities. “Other facilities” include any facilities not includable in any other Outage Initiation Code. (Note: An Automatic Outage initiated on a Transformer that is not a TADS Element is considered an AC Substation or an AC/DC Terminal-Initiated Outage since the Transformer would be considered part of an AC Substation or AC/DC Terminal.)

Outage Initiation Code Examples

- **Example 1**

- A Transformer, which is an Element, is outaged. Is its outage an Element-Initiated Outage or an AC Substation-Initiated Outage? It depends. If the outage initiated on or within the Element (e.g., an internal fault or a cracked insulator that caused a fault), the outage is Element-Initiated, even though the Transformer is in a Substation. However, if the Transformer outage was not due to the Transformer itself but due, for example, to a failed circuit breaker, it is AC Substation-Initiated.

- **Example 2**

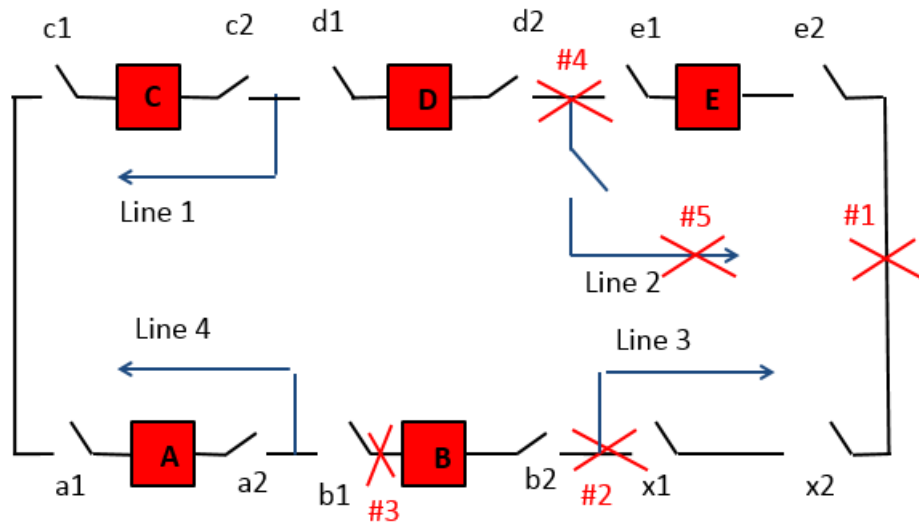
- An AC Circuit, which is an Element, has an outage that was initiated by a non-TADS Element AC Circuit. The Element outage is Other Facility-Initiated.

- **Example 3**

- An AC Circuit Outage was initiated by an Element Transformer outage. The AC Circuit Outage is Other Element-Initiated.

- **Example 4**

- An AC Circuit Outage was initiated by an non-Element Transformer outage. The AC Circuit Outage is Other Facility-Initiated.

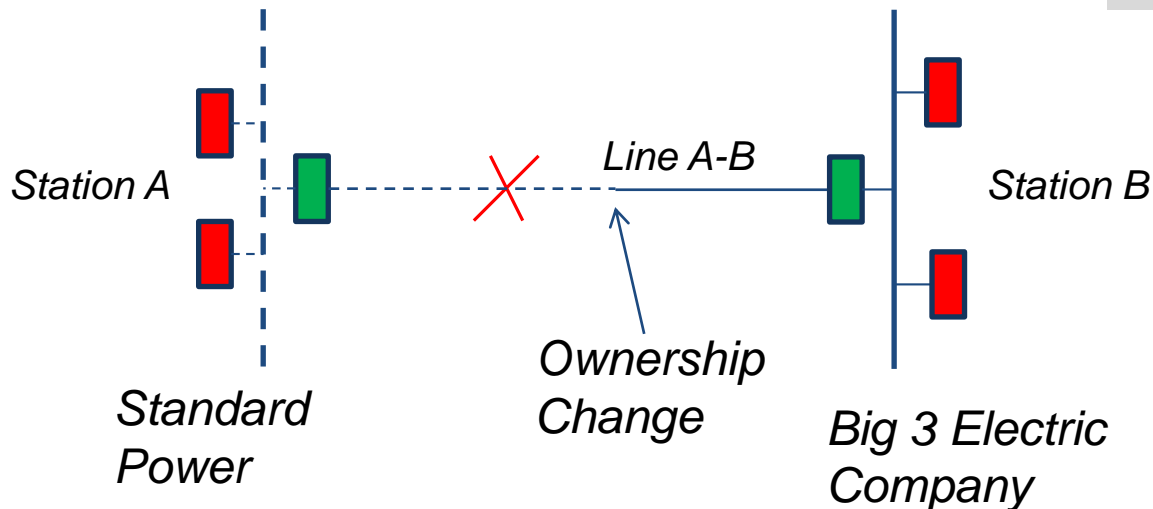


- Fault **#1** on Bus 2A:
Initiation Code = 'AC Substation Initiated'
- Fault **#2**: Initiation Code = 'Element Initiated'
- Fault **#3**: Initiation Code = 'AC Substation Initiated'
- Fault **#4**: Initiation Code = 'AC Substation Initiated'
- Fault **#5**: Initiation Code = 'Element Initiated'

A fault on an AC Circuit

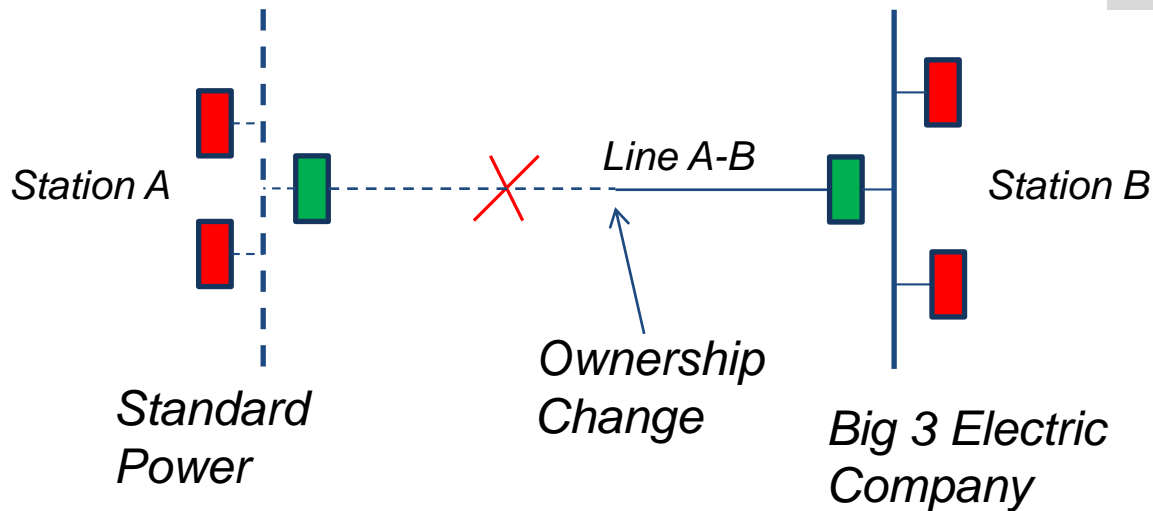
- Big 3 Electric is responsible for reporting outages on Line A-B.
- A fault occurred in Standard Power section of line.
- What is the Outage Initiation Code for Line A-B?

- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above



A fault on an AC Circuit

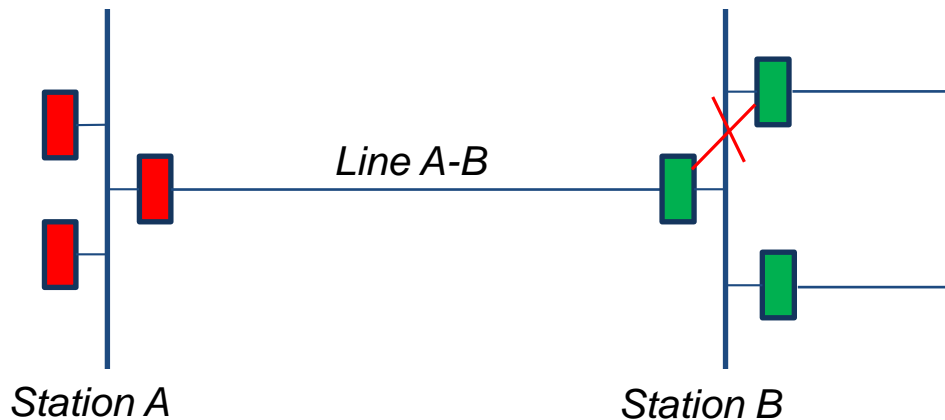
- Big 3 Electric is responsible for reporting outages on Line A-B.
- A fault occurred in Standard Power section of line.
- What is the Outage Initiation Code for Line A-B?



- A. Element-Initiated**
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

Bus Fault

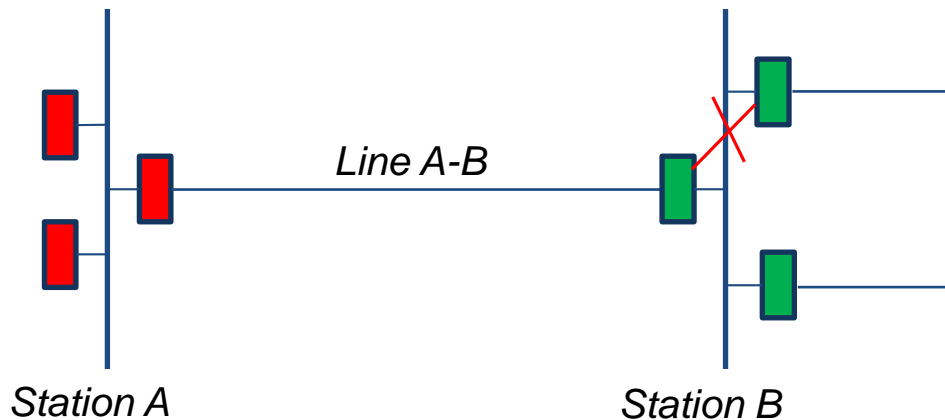
- A fault occurs on the bus at Station B.
- What is the Outage Initiation Code for Line A-B?



- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

Bus Fault

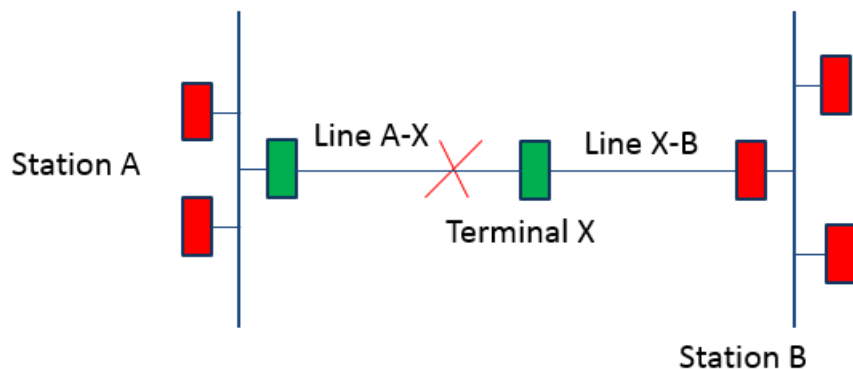
- A fault occurs on the bus at Station B.
- What is the Outage Initiation Code for Line A-B?



- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated**
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

A fault on AC Circuit 'A-X'

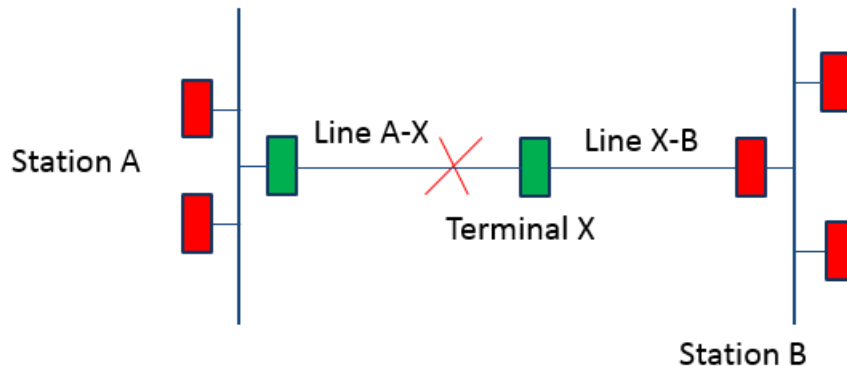
- What is the Outage Initiation Code for **Line X-B**?



- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

A fault on AC Circuit 'A-X'

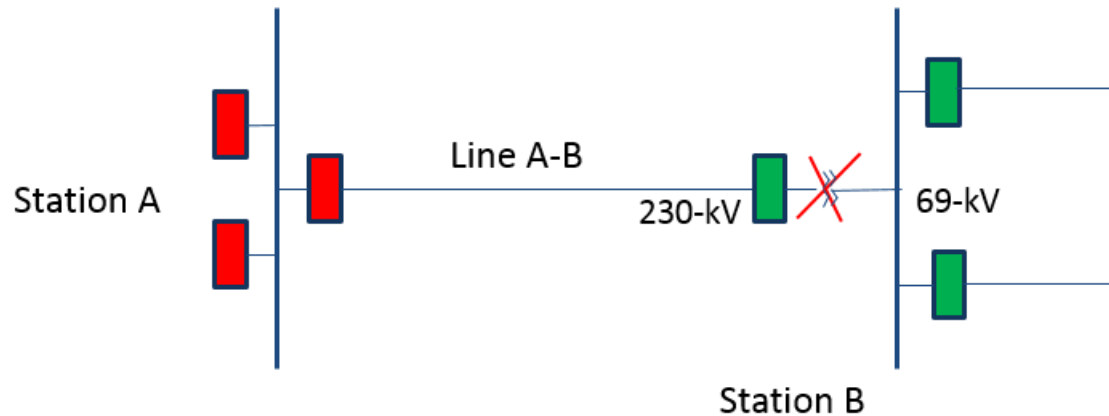
- What is the Outage Initiation Code for **Line X-B**?



- A. Element-Initiated
- B. Other Element-Initiated**
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

Non-element Transformer Fault

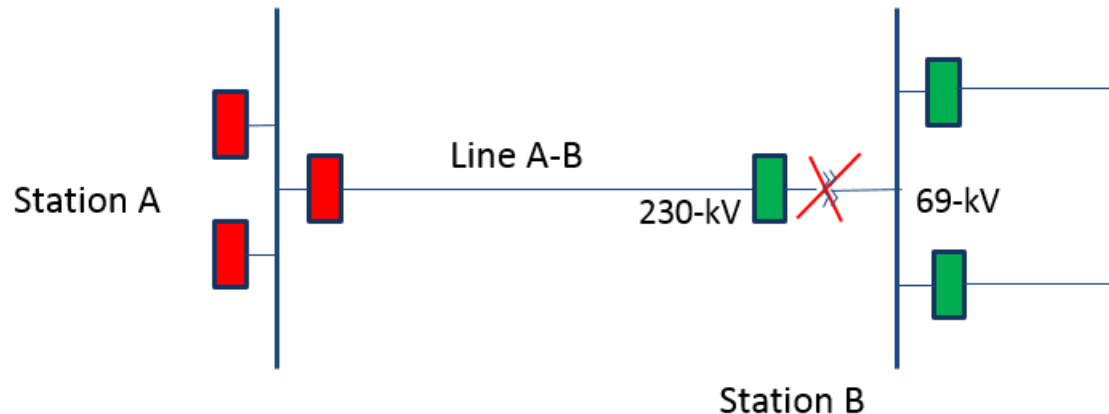
- A fault inside the non-element 230/69-kV Transformer at Station B.
- What is the Outage Initiation Code for 230-kV Line A-B?



- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

Non-element Transformer Fault

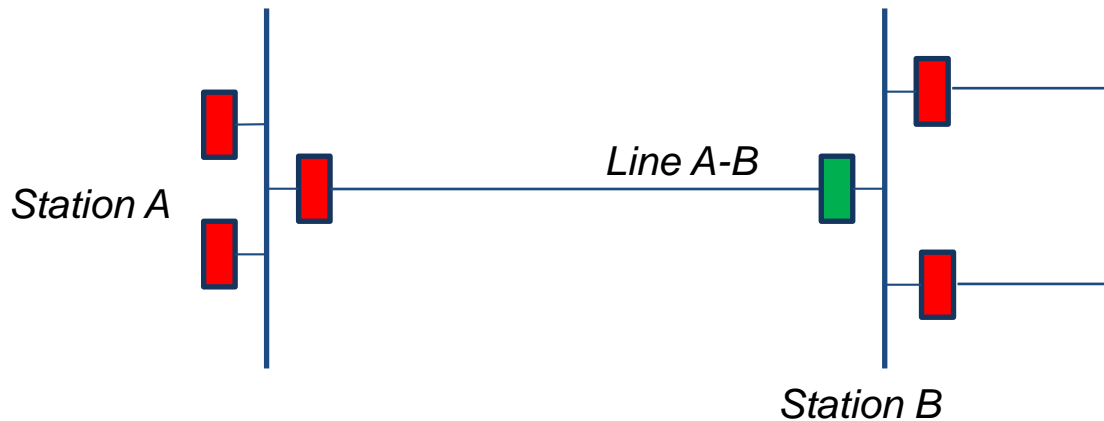
- A fault inside the non-element 230/69-kV Transformer at Station B.
- What is the Outage Initiation Code for 230-kV Line A-B?



- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated**
- F. None of the above

Human Error

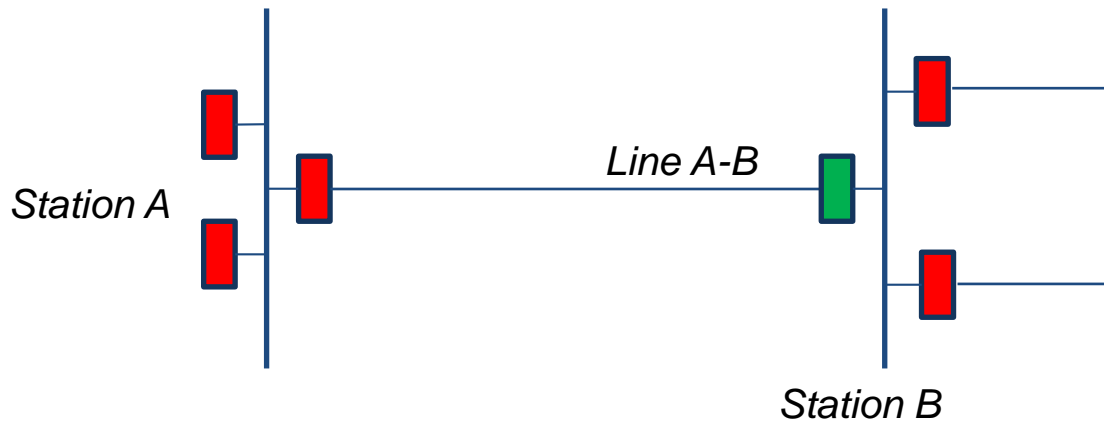
- An employee turns the wrong handle and accidentally opens the breaker at Station B on Line A-B.
- What is the Outage Initiation Code for Line A-B



- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

Human Error

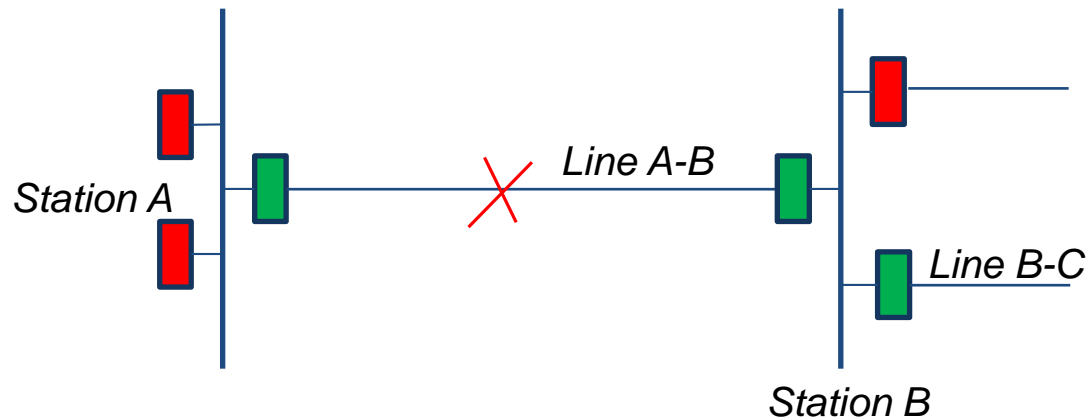
- An employee turns the wrong handle and accidentally opens the breaker at Station B on Line A-B.
- What is the Outage Initiation Code for Line A-B



- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

A fault occurs on Line A-B

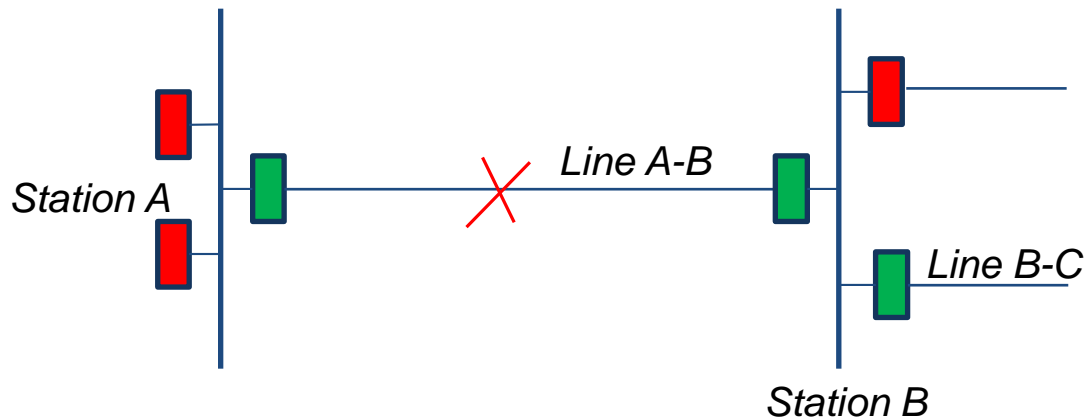
- The breaker on Line B-C erroneously opens due to relays having the wrong settings.
- What is the Outage Initiation Code for Line B-C?



- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

A fault occurs on Line A-B

- The breaker on Line B-C erroneously opens due to relays having the wrong settings.
- What is the Outage Initiation Code for Line B-C?



- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated**
- E. Other Facility Initiated
- F. None of the above

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Cause Codes: Initiating (ICC) and Sustained (SCC)

October 2020

RELIABILITY | RESILIENCE | SECURITY

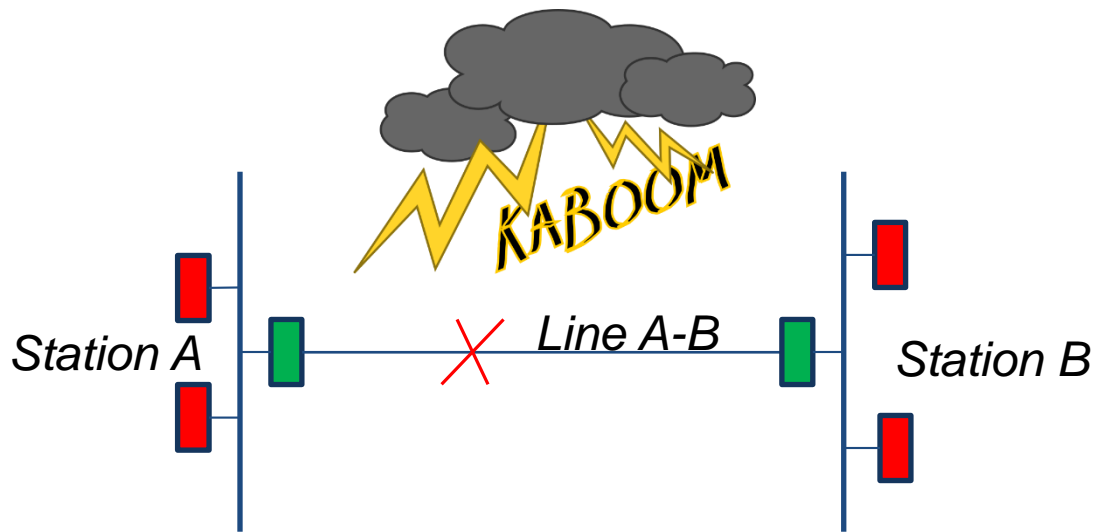


Initiating Cause Codes (ICC)

- The Initiating Cause Code describes the initiating cause of the outage.
- The Sustained Cause Code describes the cause that describes the sustained cause of the outage which contributed to the longest duration.
 - How to interpret “contributed to the longest duration”:
 - Suppose that lightning caused a conductor to break (“Failed AC Circuit Equipment”) and that the breaker for the circuit failed (“Failed AC Substation Equipment”).
 - 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.

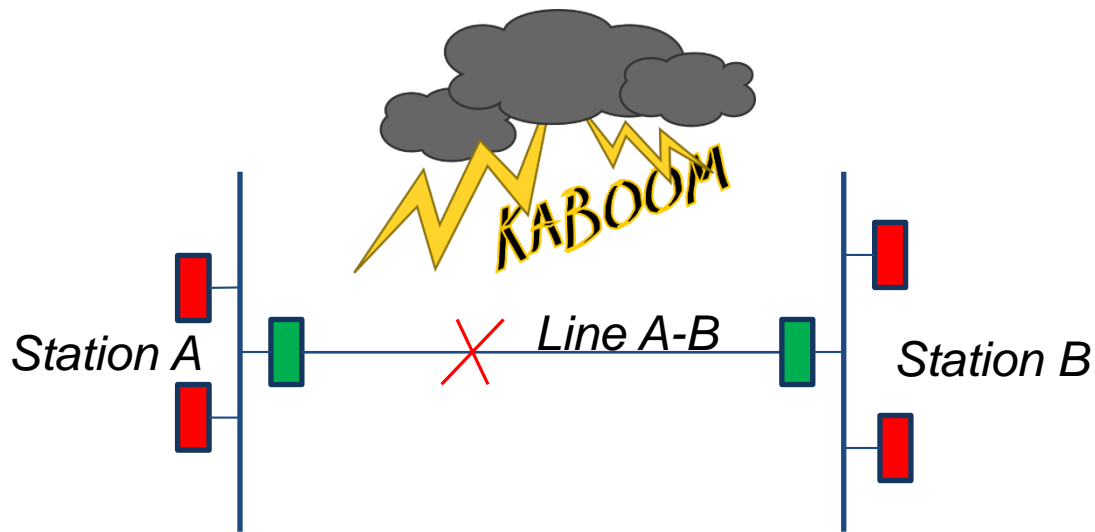
- When analyzing event...
 - Examine each Element independently
 - Ask “Why did the interrupting device operate?”
- Weather, excluding lightning
- Lightning
- Environmental
- Fire
- Contamination
- Foreign interference
- Vandalism, terrorism, malicious acts
- Vegetation
- Human error
- Failed AC Substation equipment
- Failed Protection System equipment
- Failed AC Circuit equipment
- Failed DC Circuit equipment
- Failed AC/DC Terminal equipment
- Power system condition
- Unknown
- Other

A lightning strike on an AC Circuit.
What is the Initiating Cause Code?

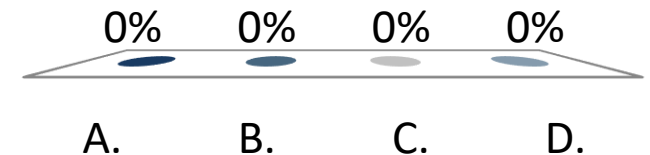


- A. Lightning
- B. Failed AC Circuit equipment
- C. Weather, excl. lightning
- D. Foreign Interference

A lightning strike on an AC Circuit.
What is the Initiating Cause Code?



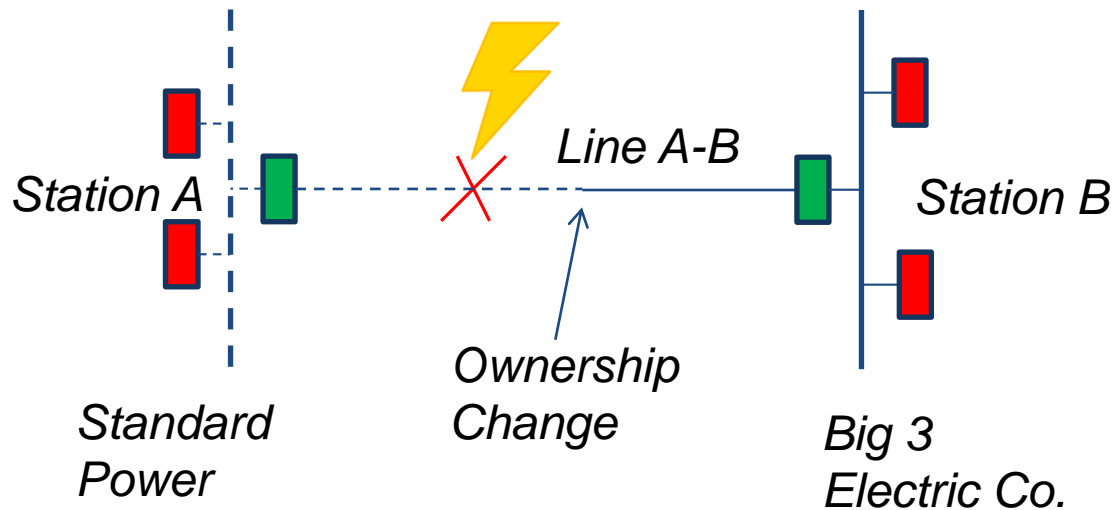
- A. Lightning
- B. Failed AC Circuit equipment
- C. Weather, excl. lightning
- D. Foreign Interference



A lightning strike on an AC Circuit. Big 3 Electric is the reporting entity for Line A-B.

What Initiating Cause Code should Big 3 Electric report for interruption that didn't occur on their equipment?

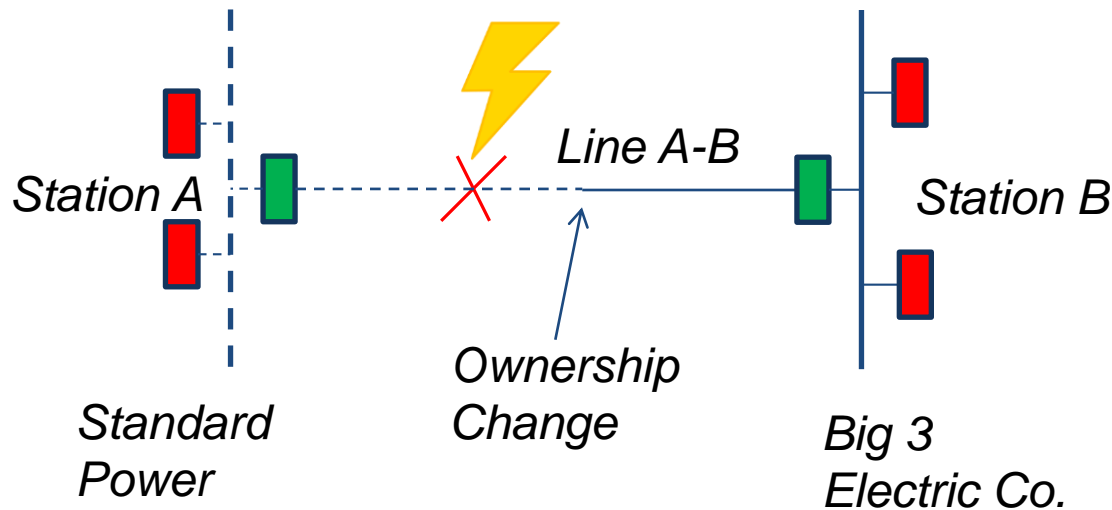
- A. Lightning
- B. Failed Protection System Equipment
- C. Foreign Interference
- D. Other



A lightning strike on an AC Circuit. Big 3 Electric is the reporting entity for Line A-B.

What Initiating Cause Code should Big 3 Electric report for interruption that didn't occur on their equipment?

- A. Lightning
- B. Failed Protection System Equipment
- C. Foreign Interference
- D. Other

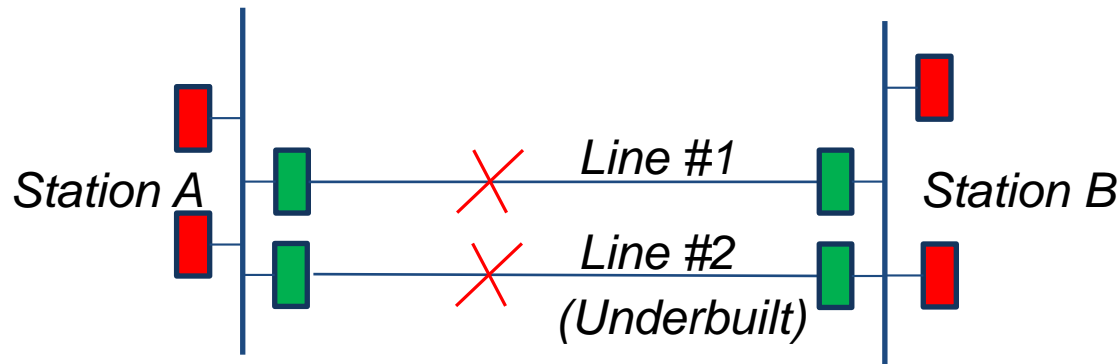


A sleeve failure occurs on Line #1 and the conductor breaks and falls into underbuilt Line #2.

(The Initiating Cause Code for Line #1 is Failed AC Circuit Equipment.)

*What is the Initiating Cause Code for **Line #2**?*

(Does it matter if different companies own the lines.)



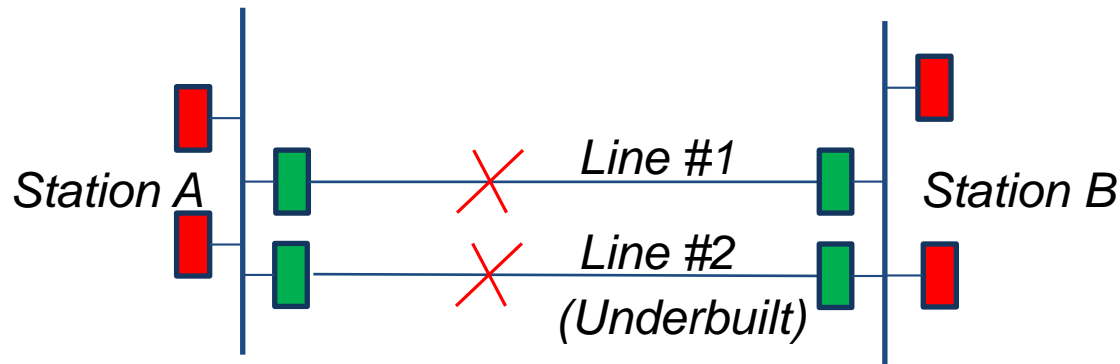
- A. Failed AC Circuit Equipment
- B. Foreign Interference
- C. Lightning
- D. Other

A sleeve failure occurs on Line #1 and the conductor breaks and falls into underbuilt Line #2.

(The Initiating Cause Code for Line #1 is Failed AC Circuit Equipment.)

*What is the Initiating Cause Code for **Line #2**?*

(Does it matter if different companies own the lines.)



- A. Failed AC Circuit Equipment
- B. Foreign Interference**
- C. Lightning
- D. Other

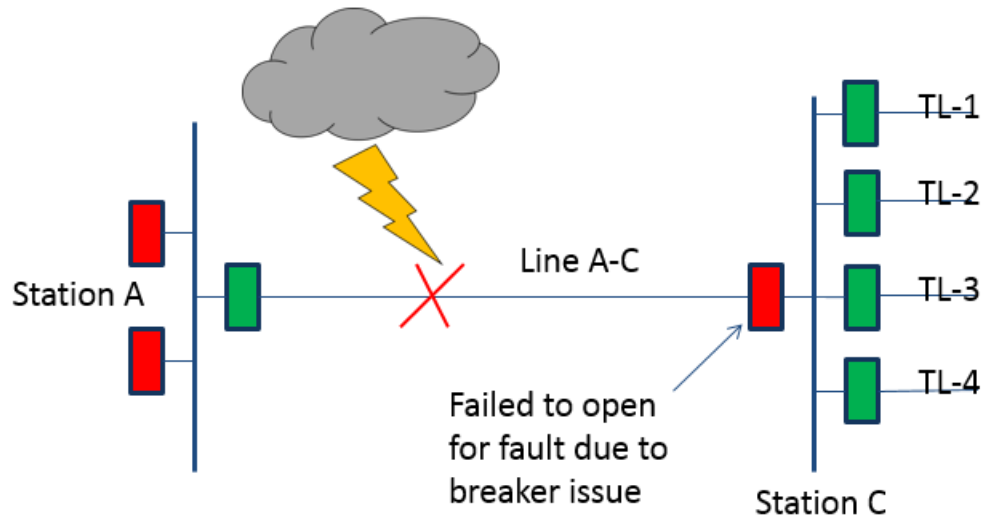
Example 4: Breaker fails to clear fault

Lightning struck Line A-C and a breaker failed to open due to breaker issue.

(The Initiating Cause Code for Line A-C is Lightning.)

*What is the Initiating Cause Code for **TL-1, TL-2, TL-3, TL-4**?*

- A. Other
- B. Lightning
- C. Weather, excl. lightning
- D. Failed Substation Equipment



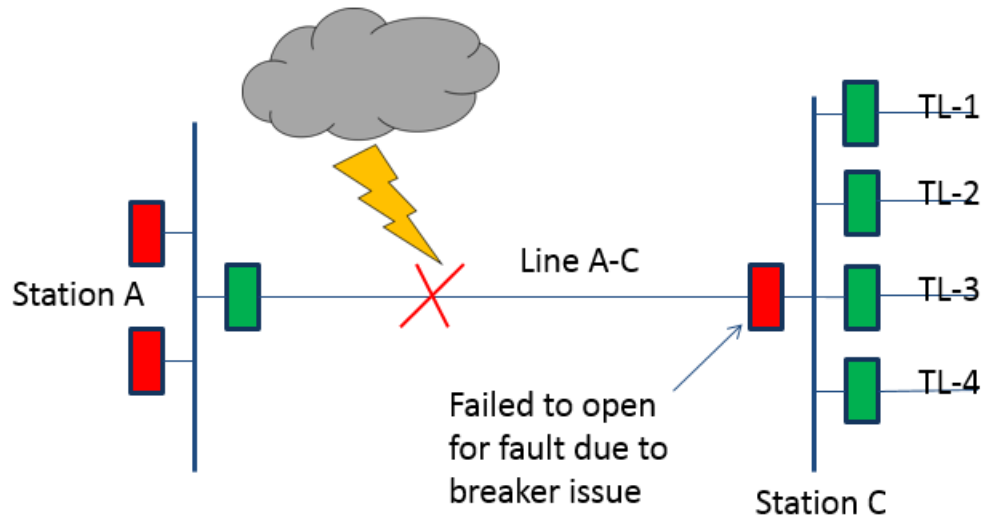
Example 4: Breaker fails to clear fault

Lightning struck Line A-C and a breaker failed to open due to breaker issue.

(The Initiating Cause Code for Line A-C is Lightning.)

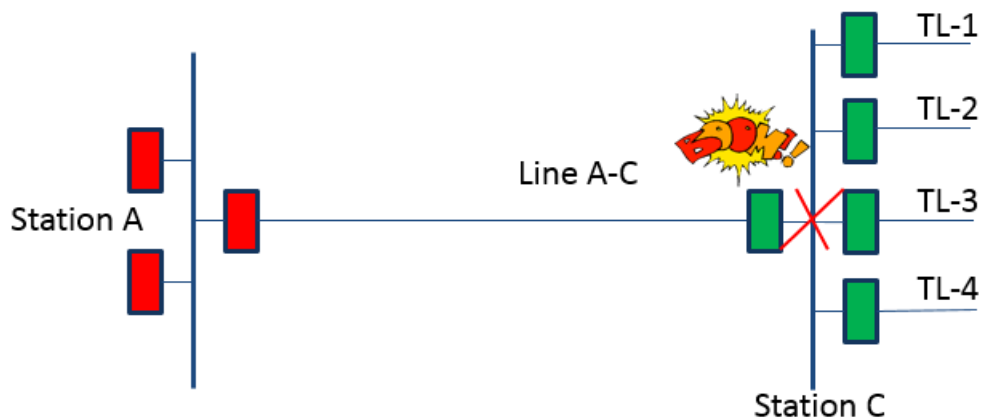
*What is the Initiating Cause Code for **TL-1, TL-2, TL-3, TL-4**?*

- A. Other
- B. Lightning
- C. Weather, excl. lightning
- D. Failed Substation Equipment**



A Potential Transformer catastrophically fails causing bus fault.

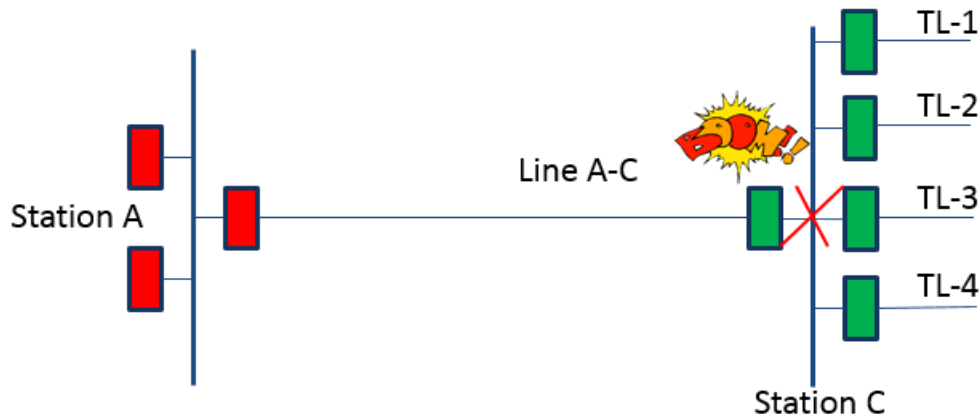
What is the Initiating Cause Code for all lines?



- A. Failed AC Circuit Equipment
- B. Failed Protection System Equipment
- C. Failed AC Substation Equipment
- D. Power System Condition

A Potential Transformer catastrophically fails causing bus fault.

What is the Initiating Cause Code for all lines?

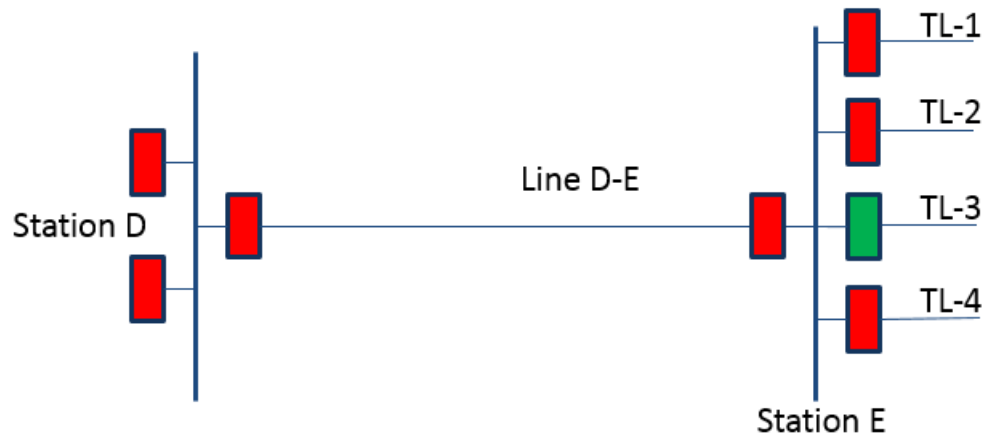


- A. Failed AC Circuit Equipment
- B. Failed Protection System Equipment
- C. Failed AC Substation Equipment
- D. Power System Condition

Failed line capacitor voltage transformer (CCVT or CVT) secondary fails causing voltage loss to relay resulting in a breaker to open on TL-3.

What is the Initiating Cause Code for TL-3?

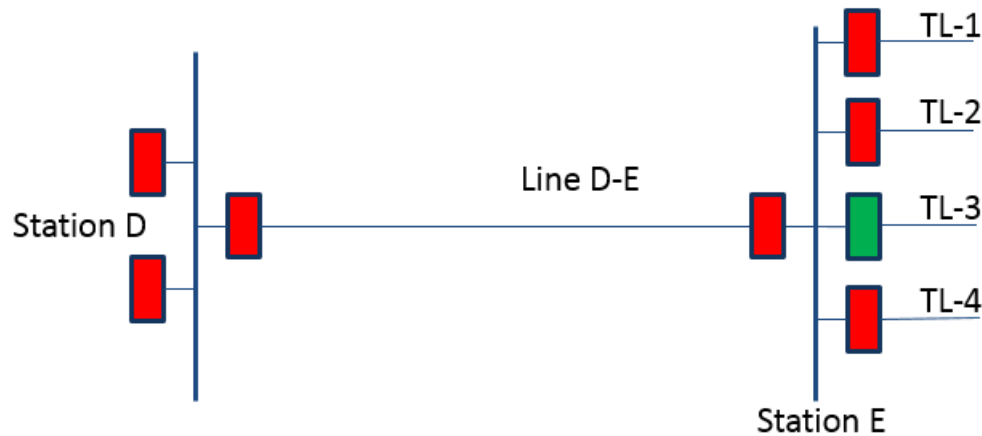
- A. Failed AC Circuit Equipment
- B. Failed Protection System Equipment
- C. Failed AC Substation Equipment
- D. Power System Condition



Failed line capacitor voltage transformer (CCVT or CVT) secondary fails causing voltage loss to relay resulting in a breaker to open on TL-3.

What is the Initiating Cause Code for TL-3?

- A. Failed AC Circuit Equipment
- B. Failed Protection System Equipment**
- C. Failed AC Substation Equipment
- D. Power System Condition

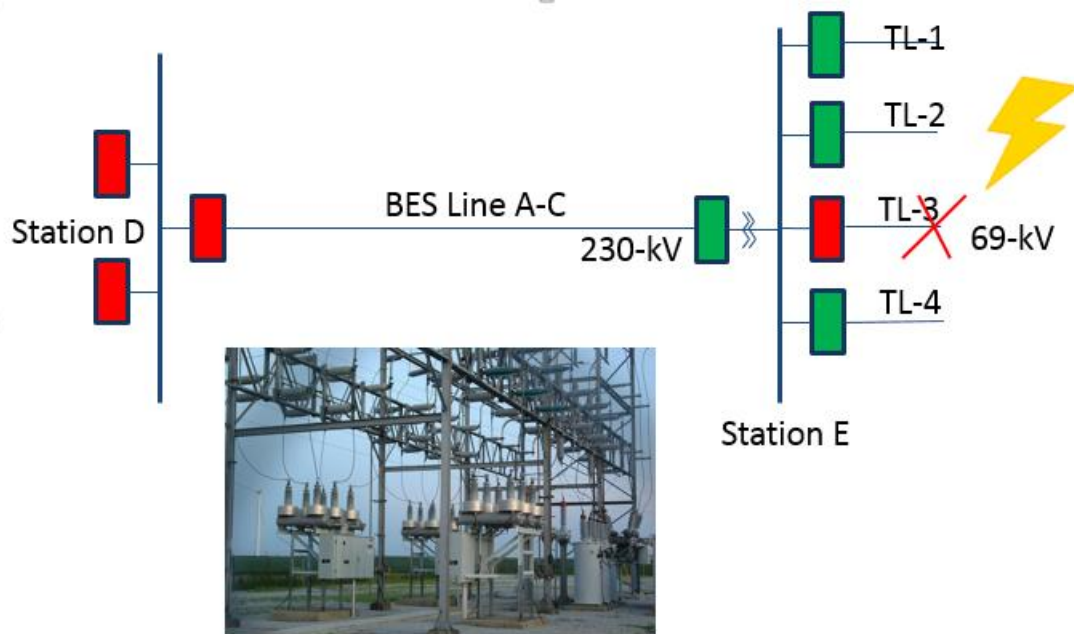


Breaker fails to clear lightning fault on 69-kV system

Again, consider why the breaker for the Element opened.

*What is the Initiating Cause Code for **Line A-C**?*

- A. Lightning
- B. Foreign Interference
- C. Failed AC Substation Equipment
- D. Failed Protection System Equipment

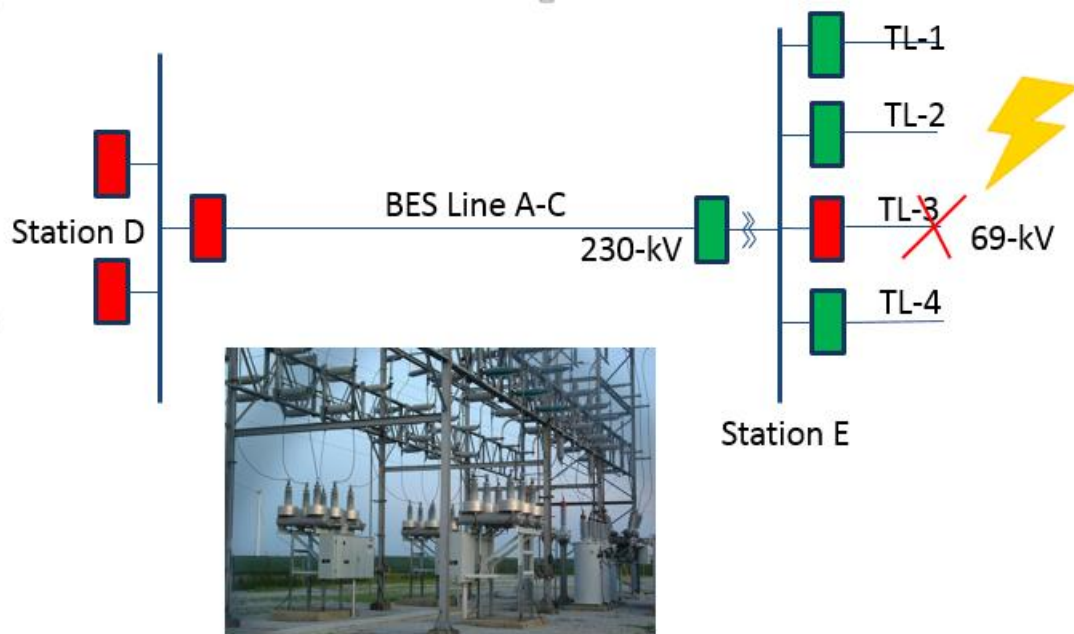


Breaker fails to clear lightning fault on 69-kV system

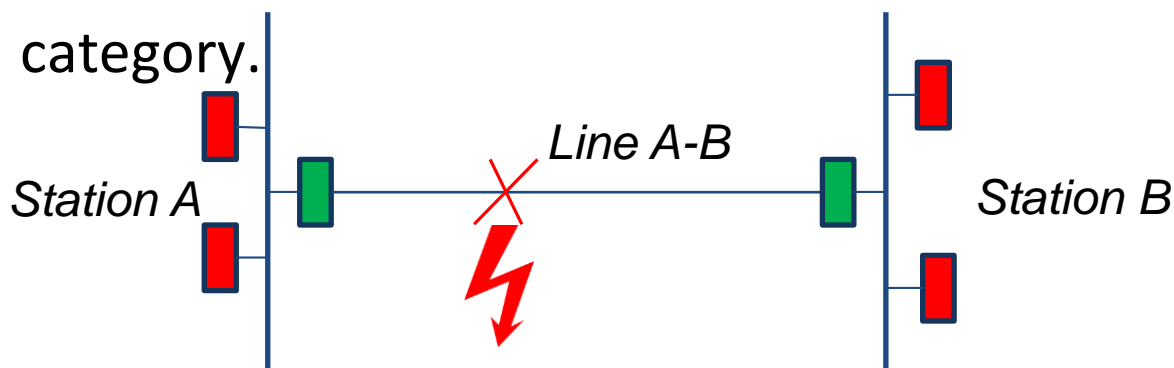
Again, consider why the breaker for the Element opened.

*What is the Initiating Cause Code for **Line A-C**?*

- A. Lightning
- B. Foreign Interference
- C. Failed AC Substation Equipment**
- D. Failed Protection System Equipment



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.



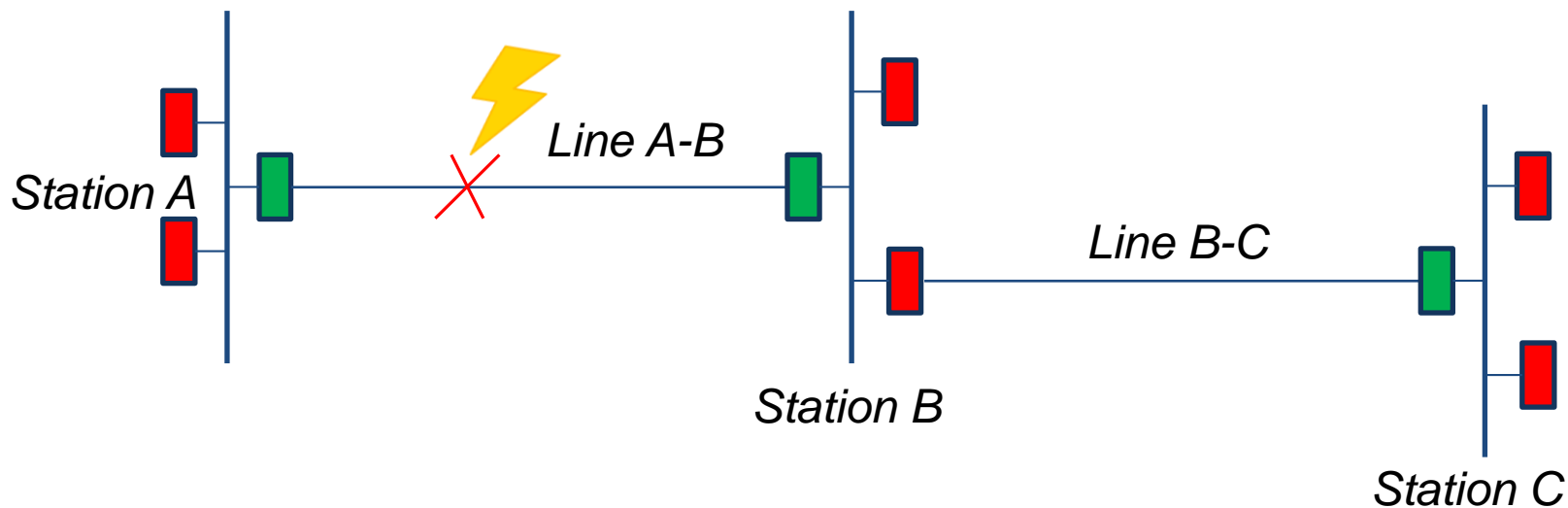
Human Error Automatic Outage Examples (Form 4.X)

- Electrician hangs ground on wrong (energized) line.
- Operator accidentally closes ground switch on line.
- Contractor cuts tree into energized line.
- Company or contractor bucket-truck contacts line.

Not Human Error Examples

- Employee flying a kite on his day off and it contacts 230-kV line is NOT Human Error (Foreign Interference).
- Customer or distribution company bucket truck contacts line (Foreign Interference).

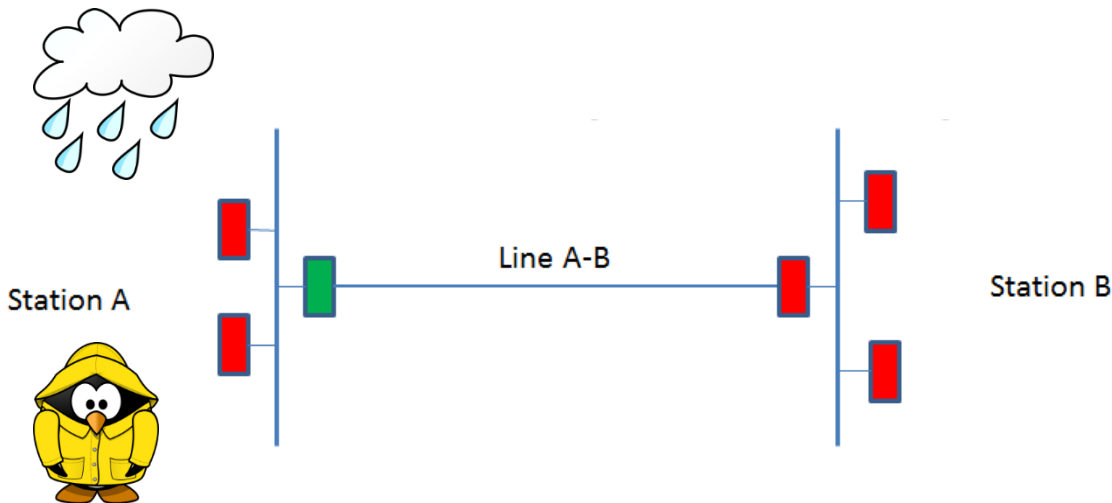
- Line A-B has lightning strike and the Line B-C relay ‘overtrips’ for fault on another line due to:
 - Wrong settings, Wiring error, or Switch in wrong position
 - Line A-B would have an initiating cause of Lightning and Line B-C would have an initiating cause of Human Error



A control house roof leak causes water to drip on a relay and causes the relay to operate opening a breaker.

- A. Weather, excl. Lightning
- B. Failed Protection System Equipment
- C. Foreign Interference
- D. Human Error – Form 4.1

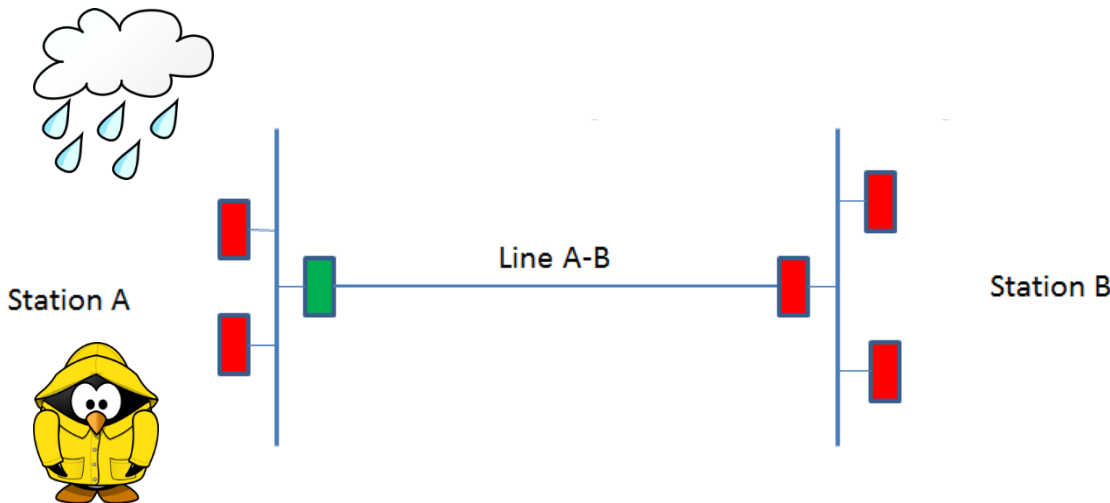
What is the Initiating Cause Code?



A control house roof leak causes water to drip on a relay and causes the relay to operate opening a breaker.

- A. Weather, excl. Lightning
- B. Failed Protection System Equipment**
- C. Foreign Interference
- D. Human Error – Form 4.1

What is the Initiating Cause Code?



- These are reported on Form 6.1 (or 6.3):
- During planned switching, electrician operates wrong handle.
 - Work plan was wrong
 - Electrician didn't correctly follow work plan
- Someone bumps a relay in the switch house
- During relay testing, accidentally trips line
- Dispatcher remotely opens wrong breaker
- Electrician shorts out wiring behind panel while working

Sustained Cause Codes (SCC)

- A sustained outage is an automatic outage with an outage duration of a **minute or greater**.
- The Sustained Cause Code describes the cause that contributed to the longest duration of the outage.
- For Sustained Cause, consider what caused the ‘longest duration’ of the outage to the Element.

- Most of the time if the Initiating Cause is one of these, then the Sustained Cause will be different, probably failed equipment (emphasis on ‘most’)...
 - Weather, excluding lightning
 - Lightning
 - Environmental
 - Fire
 - Vandalism, terrorism, malicious acts
- Remember, consider what caused the ‘longest duration’ of the outage to the Element or “what did you have to fix?”

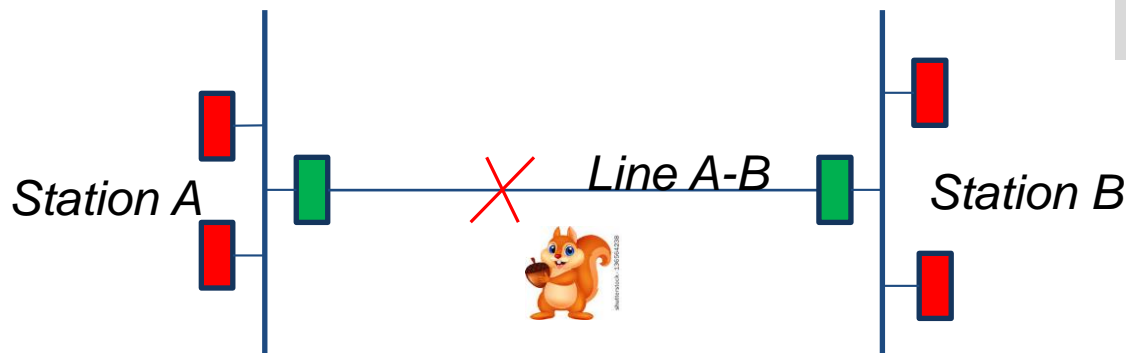
- Most of the time if the Initiating Cause is one of these, then the Sustained Cause will be the same (emphasis on ‘most’)...
 - Failed AC Substation equipment
 - Failed Protection System equipment
 - Failed AC Circuit equipment
 - Failed DC Circuit equipment
 - Failed AC/DC Terminal equipment
 - Power system condition
 - Unknown
 - Other
- Remember, consider what caused the ‘longest duration’ of the outage to the Element or “what did you have to fix?”

- Note, If you code a sustained outage as
 - Initiating cause unknown, sustained cause unknown
 - Initiating cause other, sustained cause other
- You may be contacted by your regional entity to provide additional details.

- If the Initiating Cause is one of these, then the Sustained Cause could be anything ...
 - Contamination
 - Foreign interference
 - Vegetation
 - Human error
- Remember, consider what caused the ‘longest duration’ of the outage to the Element.

A squirrel attack on an AC Circuit. Automatic reclosing fails to operate resulting in a five minute outage. The Initiating Cause Code is Foreign Interference.

What is the **Sustained Cause Code**?

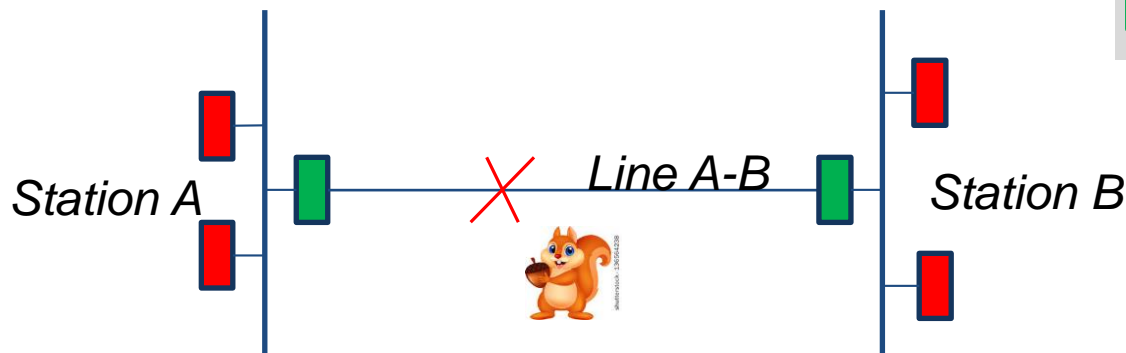


- A. Foreign Interference
- B. Failed AC Circuit Equipment
- C. Failed Protection System Equipment
- D. Failed AC Substation Equipment



A squirrel attack on an AC Circuit. Automatic reclosing fails to operate resulting in a five minute outage. The Initiating Cause Code is Foreign Interference.

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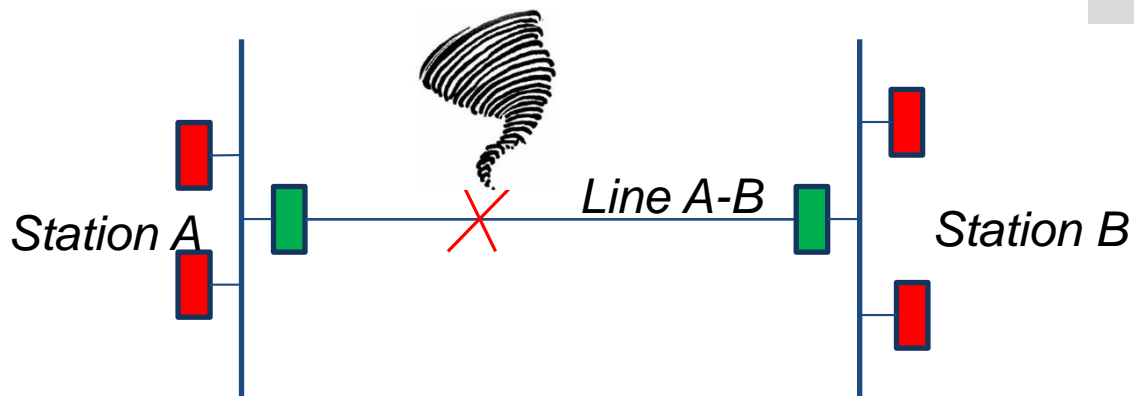


- A. Foreign Interference
- B. Failed AC Circuit Equipment
- C. Failed Protection System Equipment
- D. Failed AC Substation Equipment**



A tornado destroys a transmission tower on an AC Circuit resulting in a five day outage. The Initiating Cause Code is Weather.

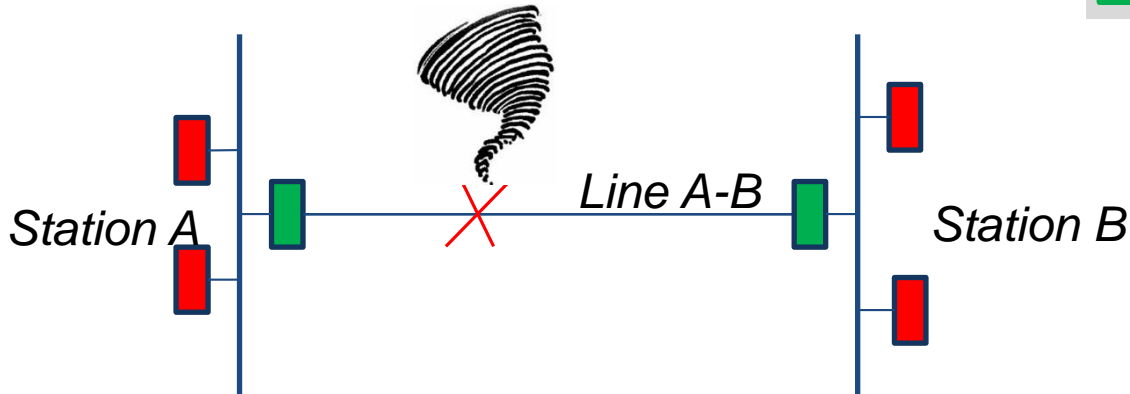
What is the **Sustained Cause Code**?



- A. Lightning
- B. Weather, excl. lightning
- C. Other
- D. Failed AC Circuit Equipment

A tornado destroys a transmission tower on an AC Circuit resulting in a five day outage. The Initiating Cause Code is Weather.

What is the **Sustained Cause Code**?



- A. Lightning
- B. Weather, excl. lightning
- C. Other
- D. Failed AC Circuit Equipment**

- Other examples where the sustained cause code would be Failed AC Circuit equipment:
 - Fire destroys transmission pole
 - Hurricane destroys transmission tower
 - Car hits transmission pole
 - Employee accidentally saws down transmission pole rather than tree
 - Alien spacecraft crashes into transmission line

Now for something completely different

Vegetation Exceptions (as contained in FAC-003-4)

Outages that fall under the exceptions should be **reported under another Cause Code** and not the Vegetation Cause Code.

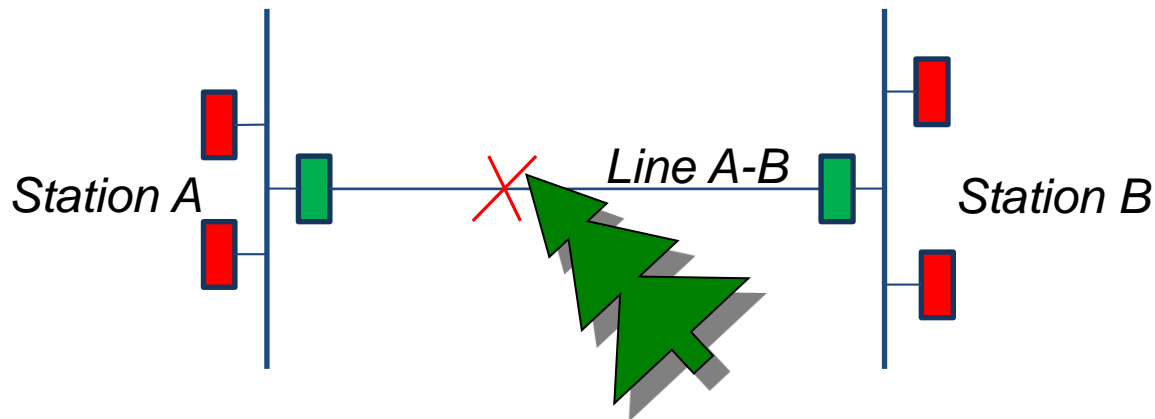
Note: For Initiating and Sustained cause codes.

Result from natural disasters examples include:	Human or Animal activity examples include:
<ul style="list-style-type: none"> • Earthquakes, Fires, Tornados, Hurricanes, Landslides, Ice storms, Floods, etc. • Wind shear • Fresh Gale (wind force 8 on the Beaufort scale 34-40 knots or 39-46 mph) • Major storms as defined either by the TO or an applicable regulatory body 	<ul style="list-style-type: none"> • Logging • Animal severing tree • Vehicle contact with tree • Arboricultural activities • Horticultural activities • Agricultural activities • Removal or digging of vegetation

A tree in the right-of-way, falls on a sunny, calm day into the transmission line. The tree is leaning into the conductor, but no equipment damage. It takes three hours to remove the tree. The Initiating Cause Code is Vegetation.

- A. Unknown
- B. Vegetation
- C. Failed AC Circuit Equipment
- D. Foreign interference

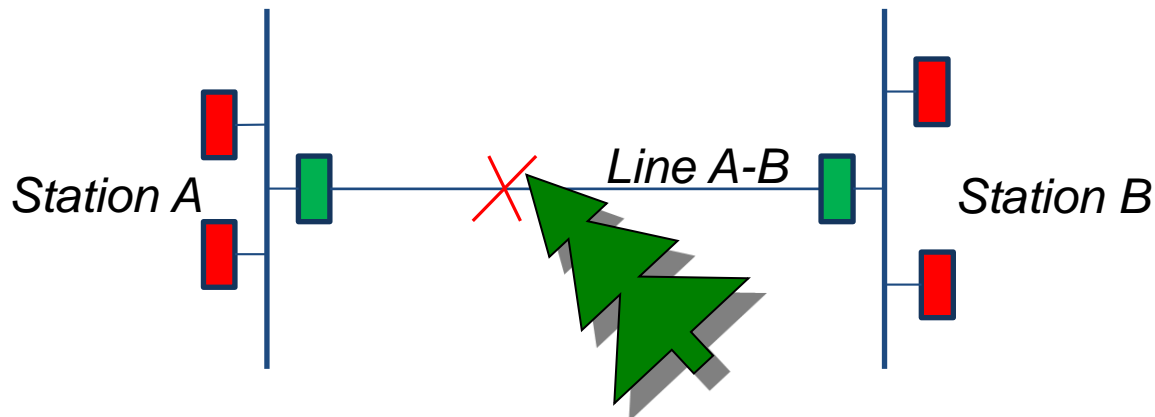
What is the **Sustained Cause** Code?



A tree in the right-of-way, falls on a sunny, calm day into the transmission line. The tree is leaning into the conductor, but no equipment damage. It takes three hours to remove the tree. The Initiating Cause Code is Vegetation.

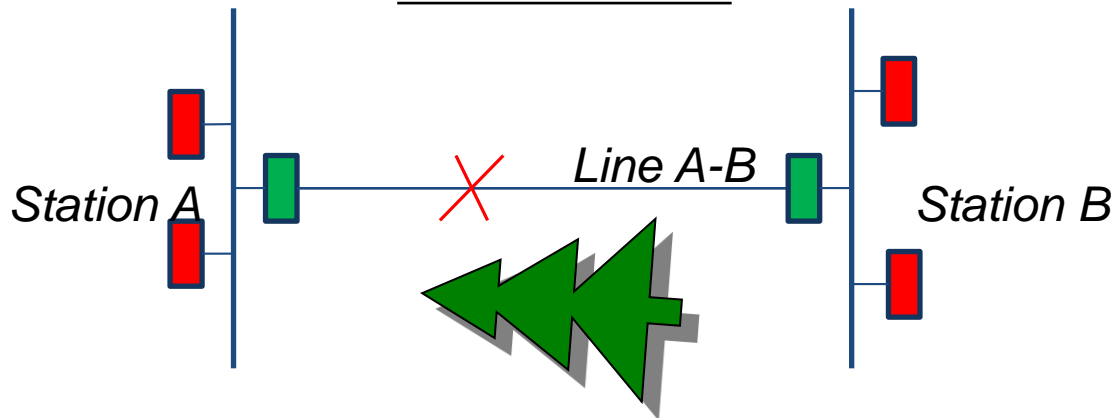
- A. Unknown
- B. Vegetation**
- C. Failed AC Circuit Equipment
- D. Foreign interference

What is the **Sustained Cause** Code?



A tree in the right-of-way, falls on a sunny, calm day into the transmission line. The tree breaks the conductor. It takes three hours to repair the conductor. The Initiating Cause Code is Vegetation.

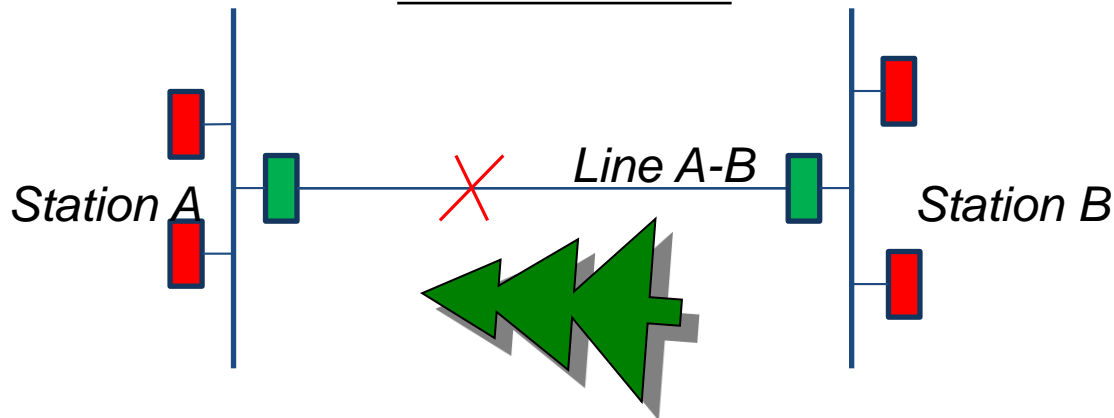
What is the **Sustained Cause** Code?



- A. Unknown
- B. Vegetation
- C. Failed AC Circuit Equipment
- D. Foreign interference

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What is the **Sustained Cause** Code?

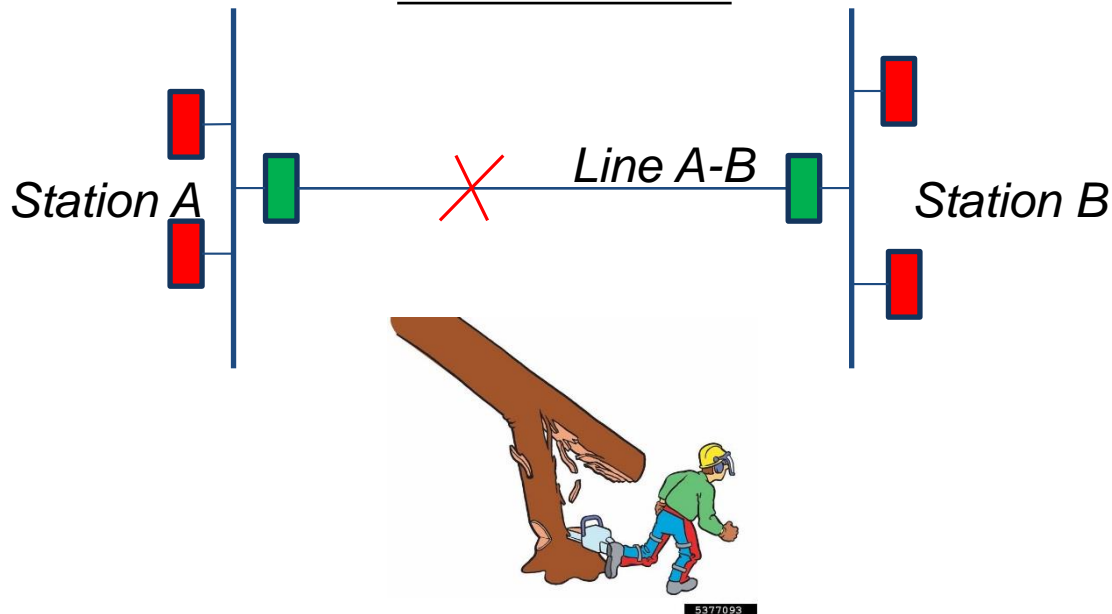


- A. Unknown
- B. Vegetation
- C. Failed AC Circuit Equipment
- D. Foreign interference

A tree is cut into the energized line by utility personnel, breaking the conductor. It takes three hours to repair the conductor. The Initiating Cause Code is Human Error (Form 4.1).

- A. Unknown
- B. Vegetation
- C. Failed AC Circuit Equipment
- D. Foreign interference

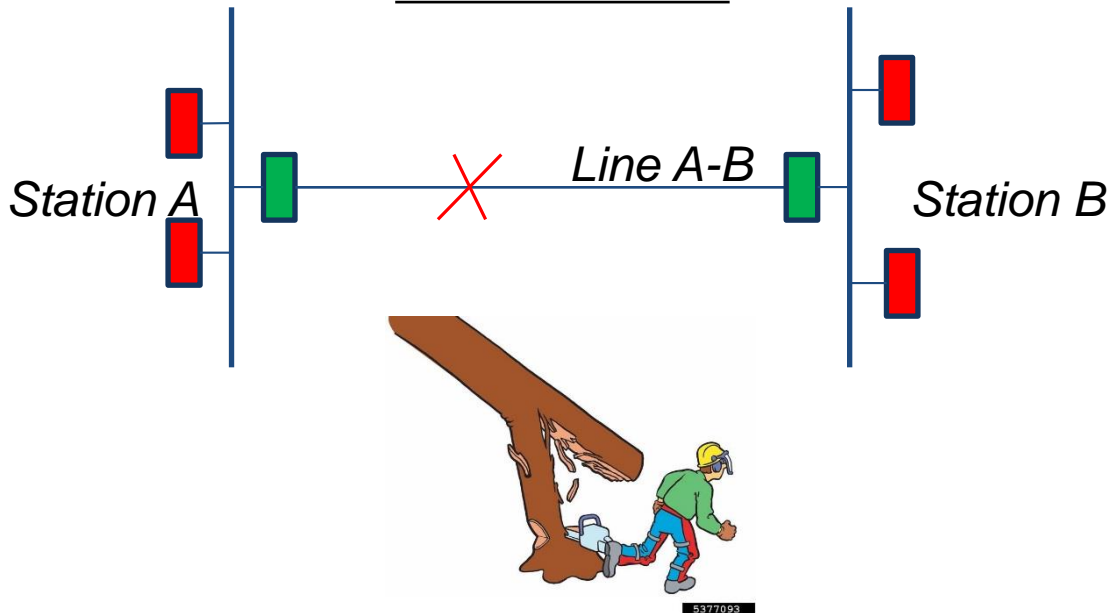
What is the **Sustained Cause** Code?



A tree is cut into the energized line by utility personnel, breaking the conductor. It takes three hours to repair the conductor. The Initiating Cause Code is Human Error (Form 4.1).

- A. Unknown
- B. Vegetation
- C. Failed AC Circuit Equipment
- D. Foreign interference

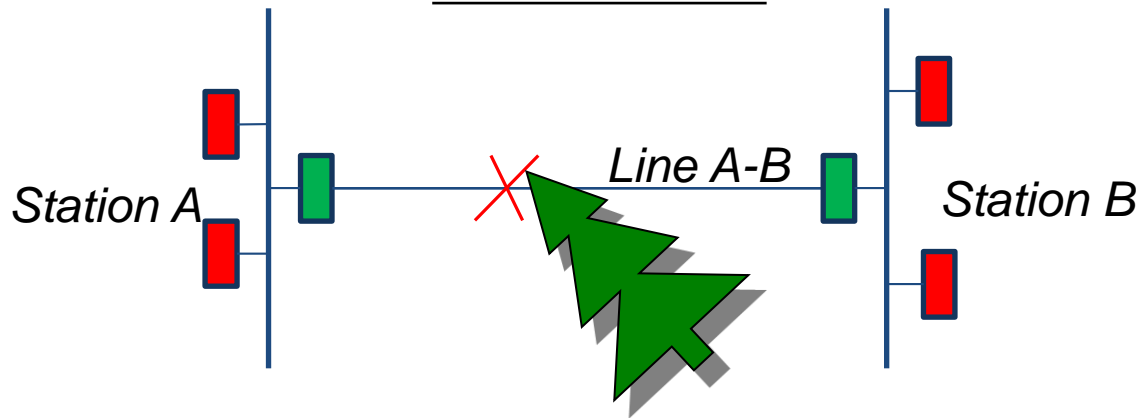
What is the **Sustained Cause** Code?



A tree is cut into the energized line by your utility employee, conductor doesn't break, leans into line. It takes three hours to remove the tree. The Initiating Cause Code is Human Error (Form 4.1).

- A. Human Error
- B. Vegetation
- C. Failed AC Circuit Equipment
- D. Foreign interference

What is the **Sustained Cause** Code?

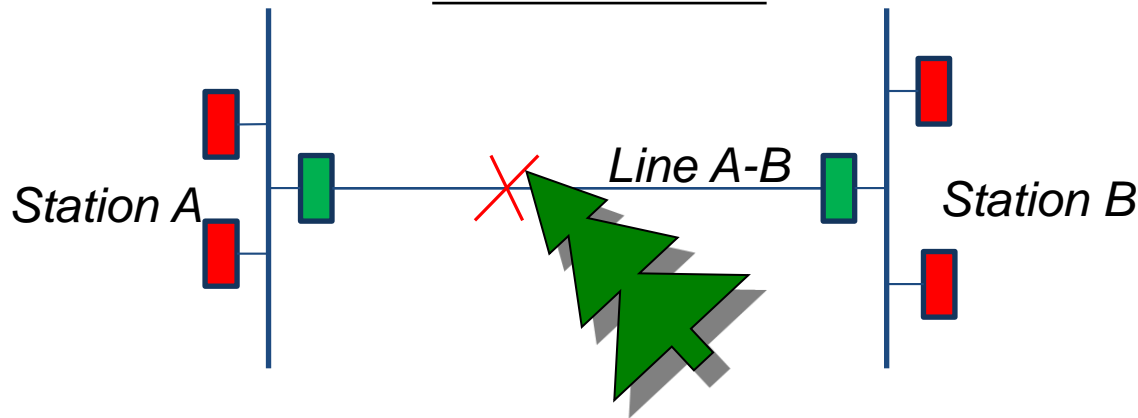


Not vegetation because of exception under vegetation, Nothing broke so not Failed equipment, Not Foreign Interference because of exception.

A tree is cut into the energized line by your utility employee, conductor doesn't break, leans into line. It takes three hours to remove the tree. The Initiating Cause Code is Human Error (Form 4.1).

- A. Human Error
- B. Vegetation
- C. Failed AC Circuit Equipment
- D. Foreign interference

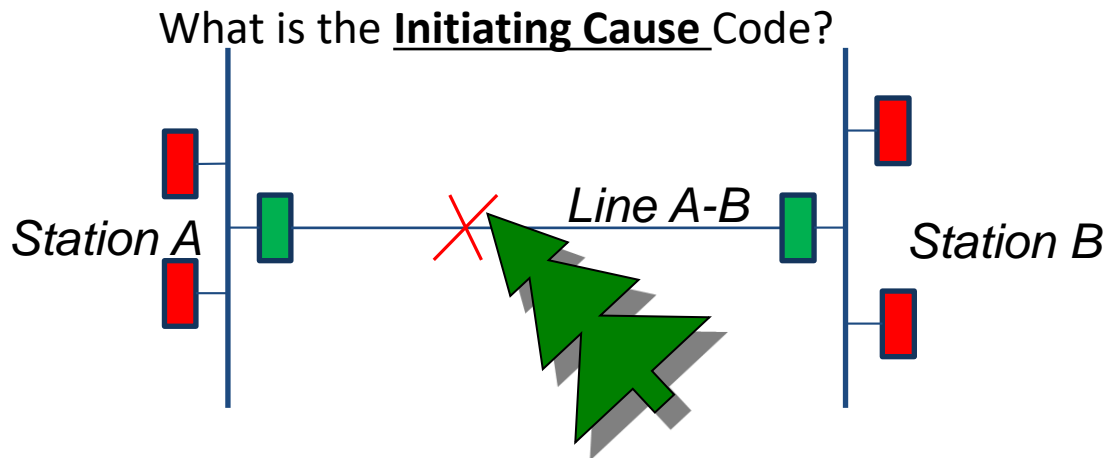
What is the **Sustained Cause** Code?



Not vegetation because of exception under vegetation, Nothing broke so not Failed equipment, Not Foreign Interference because of exception.

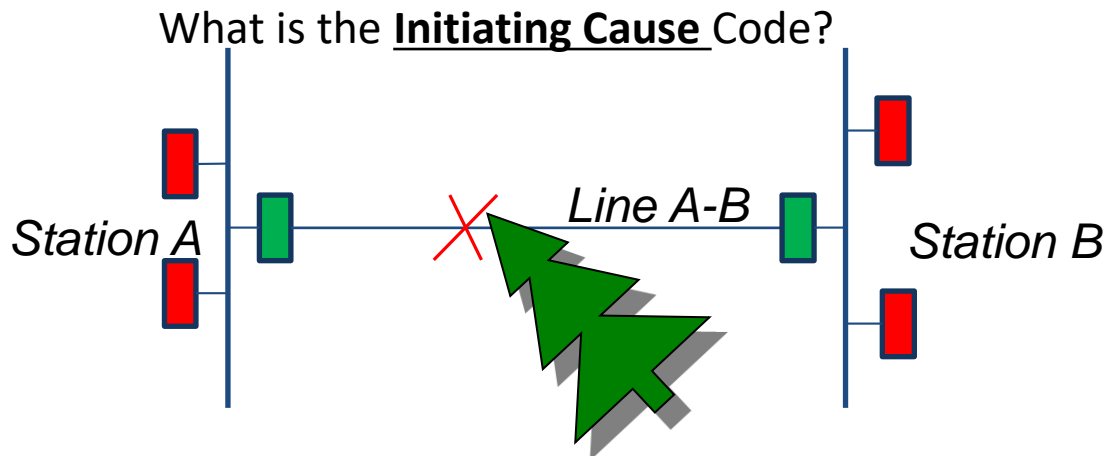
A tree off the right-of-way, falls during a storm into the transmission line. The tree is leaning into the conductor, but is not damaged. It takes three hours to remove the tree.

- A. Vegetation
- B. Foreign Interference
- C. Weather, excl. Lightning
- D. Failed AC Circuit Equipment



A tree off the right-of-way, falls during a storm into the transmission line. The tree is leaning into the conductor, but is not damaged. It takes three hours to remove the tree.

- A. Vegetation
- B. Foreign Interference
- C. Weather, excl. Lightning
- D. Failed AC Circuit Equipment



A stylized map of North America is centered on the page. The map is divided into three horizontal color bands: a light blue band at the top, a medium blue band in the middle, and a dark blue band at the bottom. The text "Questions and Answers" is overlaid on the middle band.

Questions and Answers

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Fault Types

October 2020

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- The descriptor of the fault, if any, associated with each Automatic Outage of an Element.
 1. No fault
 2. Phase-to-phase fault (P-P)
 3. Single phase-to-ground fault (P-G)
 4. Phase-to-phase-to-ground (P-P-G), 3P, or 3P-G fault
 5. Unknown fault type
 - NOTE for TADS purposes the Fault Type chosen should:
 - Be based on TO best judgment of what occurred
- Represent the worst impact on system dynamic stability

- If an Element has an Automatic Outage and its Outage Initiation Code is:
 - Element-Initiated - report Fault Type 1-5 as appropriate.
 - Other Element-Initiated - report Fault Type 1, No fault
 - the Fault Type will be reported for the other Element that initiated the outage
 - AC Substation-Initiated or AC/DC Terminal Initiated -
 - If fault occurred on BES AC equipment report Fault Type 2-5 as appropriate.
 - If a fault did not occur OR if a fault occurred on non-BES AC equipment report type 1, No fault.
 - Other Facility-Initiated or Protection System-Initiated - report Fault Type 1, No fault.

- No Fault: An outage occurs and no electrical short circuit was present to cause the outage **on the element being reported.**
 - Over/Under voltage, overload, RAS schemes, Dependent Mode outages, Protection System component failures would be coded as no fault.
- A BES 500kV line tripped because of incorrect relay settings during a 3 phase fault on a 230kV line a bus away. The outage record for the 500kV line would be selected as no fault.

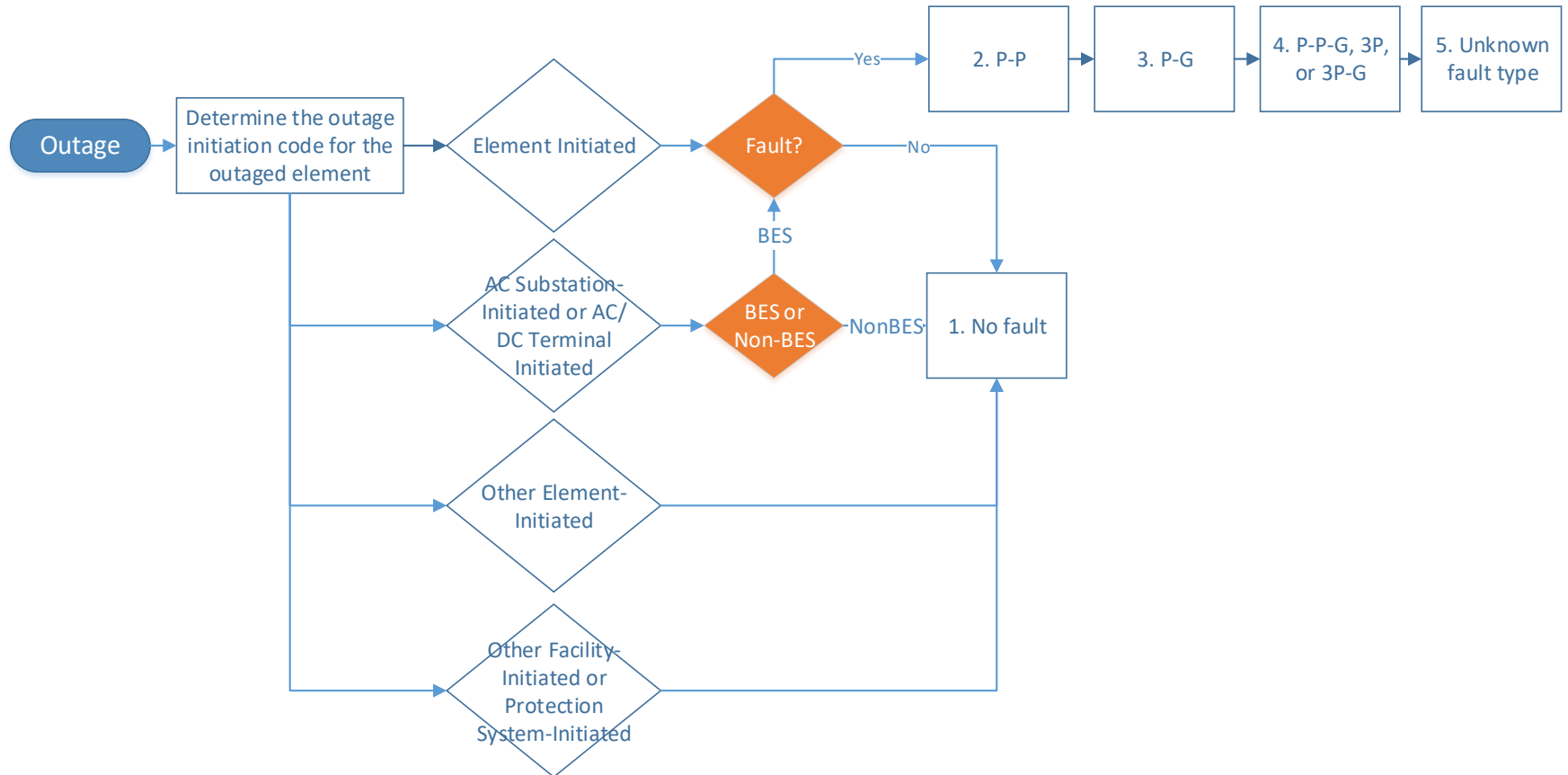
- This fault occurs when a single phase conductor short circuits to the earth (ground) neutral point.
 - Typical targets would include Ground, Neutral, Ground Inst, Z1 G, Carrier Ground, Z2 G, Ground Time, etc. However if any multi-phase or phase pair targets are indicated this would not be a single phase to ground fault.
- Bird contamination on a bottom phase of a vertical constructed circuit causes a flash from the bottom line conductor to tower. Relay targets were Ground Inst and Carrier Ground.

- This fault type occurs when any two phase wires short circuit to each other without contacting the earth ground plain or the third phase in the circuit.
 - Typical targets could be AB, BC, CA, Zone 1 Phase, Zone 2 Phase, A and B Time, B and C Time, C and A Time. If any ground targets are indicated, it is not a Phase to Phase fault.
- A tree branch breaks cleanly from the tree and falls into two phase wires on a horizontal circuit.

- This fault type occurs when any two phase wires short circuit to each other and earth neutral or ground at the same time. Or when all three phase wires short to each other by themselves or with ground contact.
- A transmission crossarm breaks and drops all three phase wires to the ground. All three phase wires make contact with the earth at the same time causing a 3 phase fault.

- In instances where the fault type changes over the duration of the fault, the fault type should be reported as the most egregious option.
- As an example; a fault initiates as a single phase to ground then evolves into a two phase to ground fault. The fault should be reported as a two phase to ground fault.

- Fault recorder/Digital Relay records
 - While not always available, records from remote stations could indicate which phases were involved and provide the best information for determining fault type.
- Relay Targets
 - While usually available, may be cumbersome to evaluate when multiple events have occurred before the targets are obtained from a station.
- Patrol Results
 - When relay targets or fault records are not available, patrol results can tell what the fault type was based on damage reports or repairs made.



- Lightning causes a single phase to ground fault on a 500kV AC Circuit which causes an outage to the circuit. A BES 500/230kV transformer is connected to the circuit at one of the circuit's terminals. When an outage occurs on the 500kV line, the transformer must also be outaged.

Element	Fault Type
500kV Line	<i>Single Phase to Ground Fault</i>
500/230kV Transformer	<i>No Fault</i>

- A 230kV wooden crossarm breaks and drops all three wires to the ground. One wire makes contact first and the line protection trips the circuit breakers, outaging the line before the other two phase wires make contact with the earth or each other. When the line recloses the breakers, all three phase wires are making contact with the earth.

Element	Fault Type
230kV line	<i>Phase-to-phase-to-ground (P-P-G), 3P, or 3P-G fault</i>

- A Non BES 345/23kV transformer is connected to a BES 345kV line. The protection on the non BES transformer misoperates and sends a trip signal to outage the BES 345kV line.

Element	Fault Type
345kV Line	<i>No Fault</i>

- A 500kV line has an A-G fault and trips out the A phase portion of the circuit, however the remaining phase B and C remained energized. The A phase pole successfully reclosed after 10 seconds. This only pertains to single pole tripping.

Element	Fault Type
<i>Single pole outages are not reportable.</i>	

A stylized map of North America, including the United States, Canada, and Mexico. The map is rendered in shades of blue and grey. A horizontal band of medium blue color passes behind the map, serving as a background for the title text.

Questions and Answers

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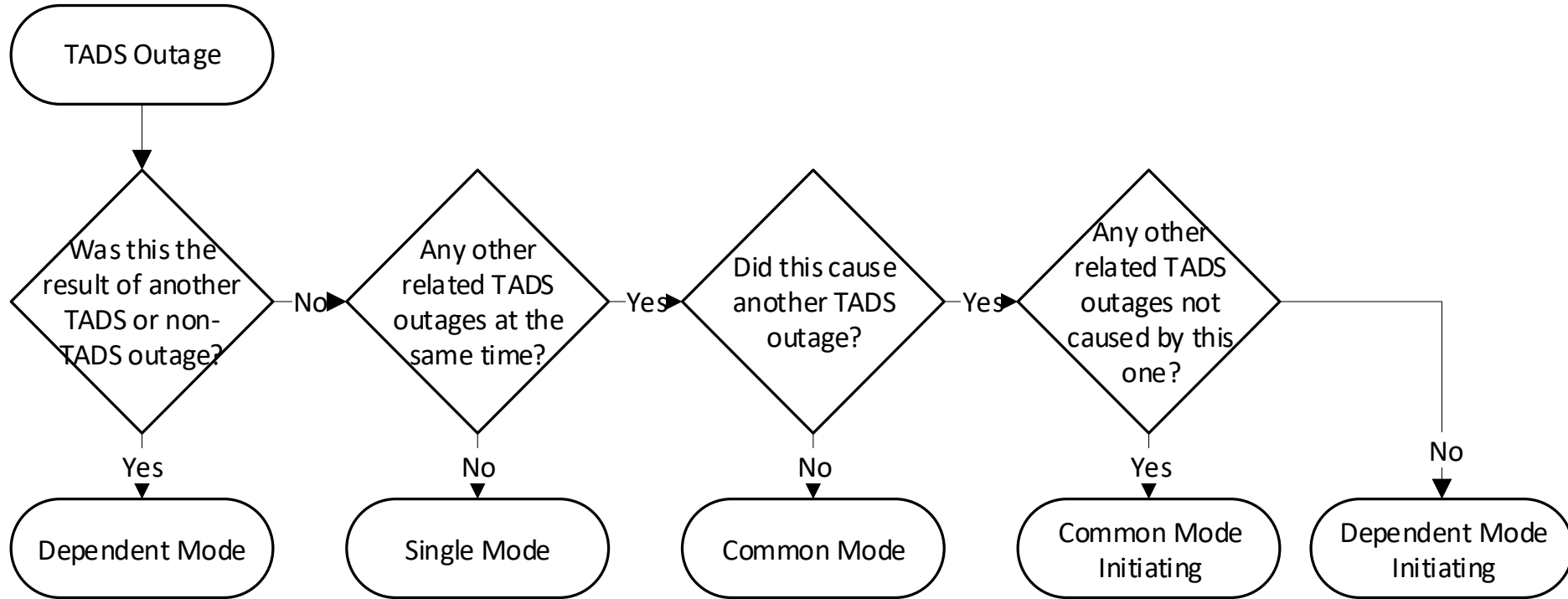
Outage Modes

October 2020

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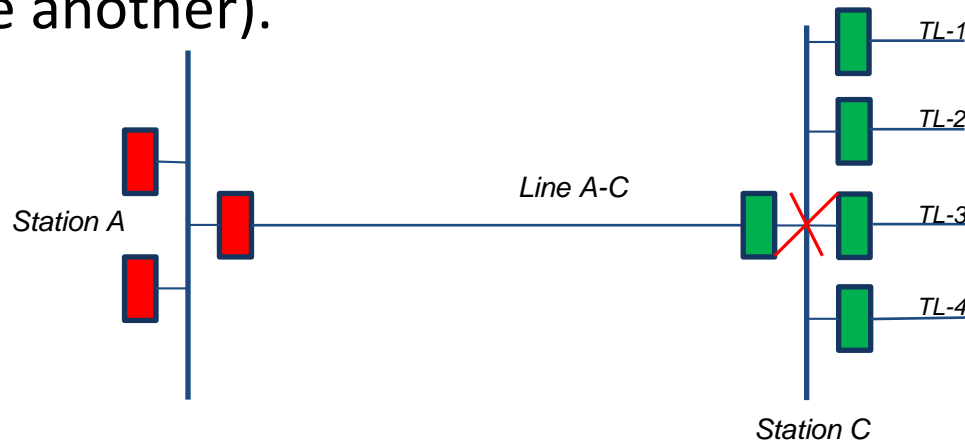


- The Outage Mode Code describes whether an Automatic Outage is related to other Automatic Outages.
 - Single Mode Outage
 - Dependent Mode Initiating Outage
 - Dependent Mode Outage
 - Common Mode Outage
 - Common Mode Initiating Outage



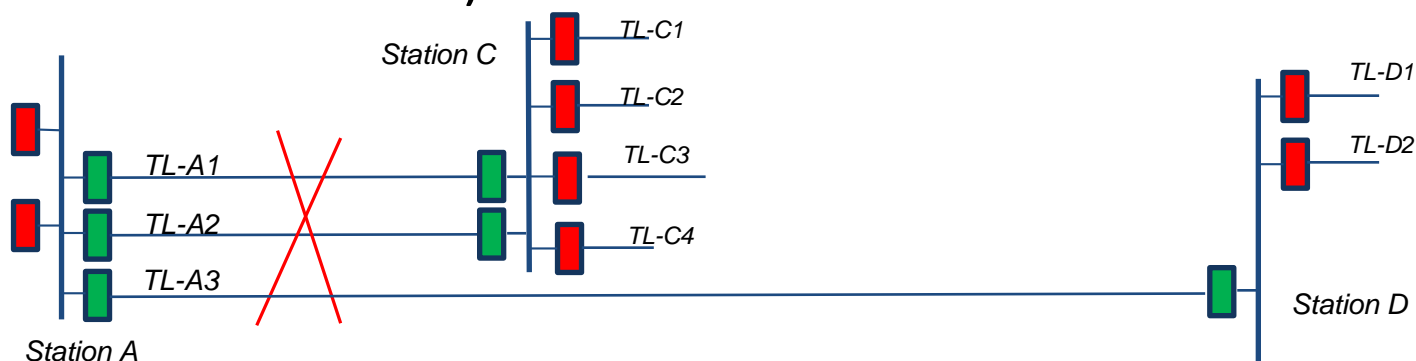
An Automatic Outage of a single Element that occurred independent of any other Automatic Outages (if any).

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).



- *Bus Fault*

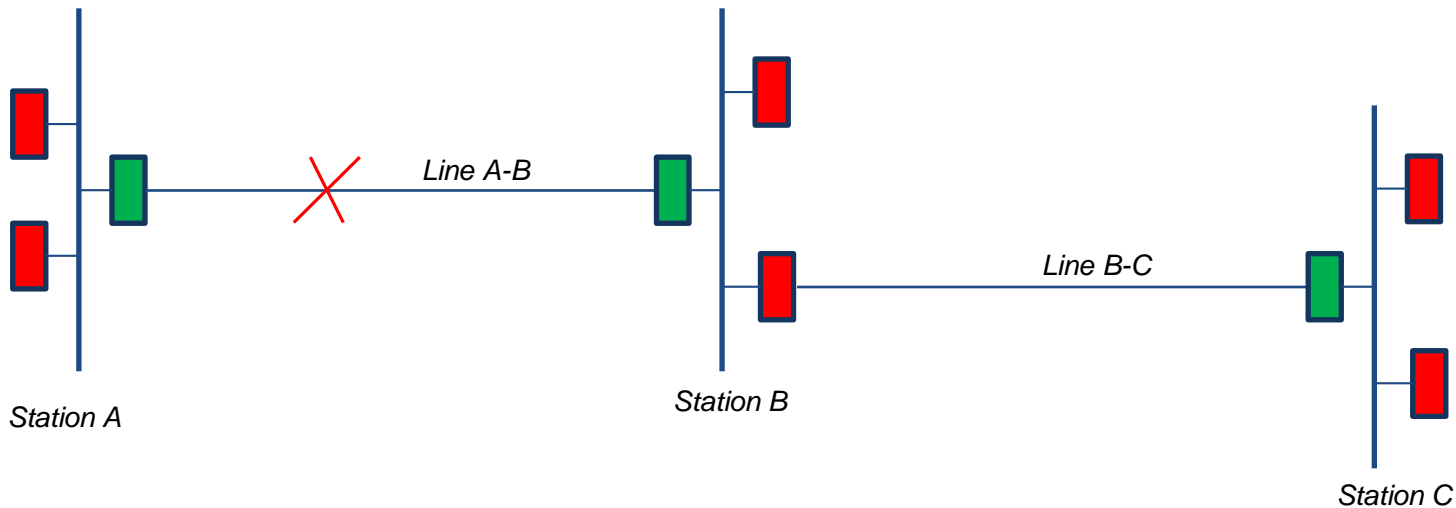
One of **two or more** Automatic Outages with the **same Initiating Cause Code** and where the outages are not consequences of each other and occur nearly **simultaneously** (i.e., within cycles or seconds of one another).



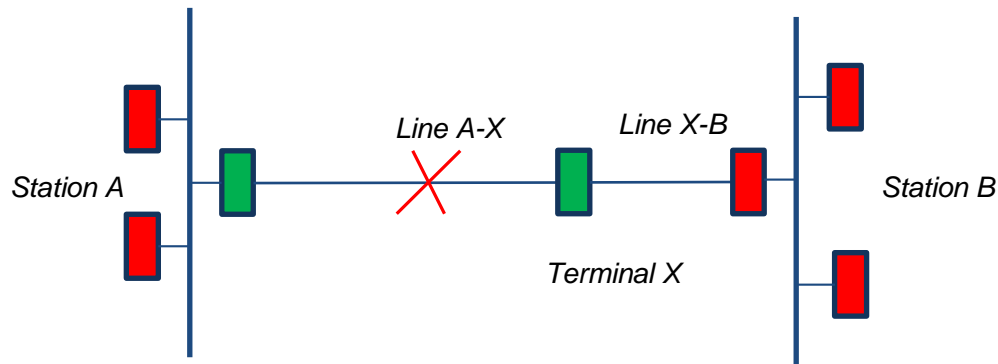
- Single 'Cause' (Lighting, Tornado, etc.), near simultaneous:
 - Do they share tower (River Crossing?) – Common Mode
 - Are they in close proximity, share ROW – Common Mode

- Two or more outages
- One outage can be non-Element; hence not all Dependent Mode outages will have an associated Dependent Mode Initiating Outage
- Dependent Mode Outage must be a result of another outage.
- Initiating Outage:
 - Single Element: Dependent Mode Initiating Outage
 - Multiple Elements with same Cause at the same time and not consequences of each other: Common Mode Initiating Outage
- Resulting Outage:
 - Single Element: Dependent Mode Outage
 - Multiple Elements with same Cause at the same time and not consequences of each other: Common Mode Outage
 - Multiple Elements with same Cause at the same time and are consequences of each other: Dependent Mode Outage

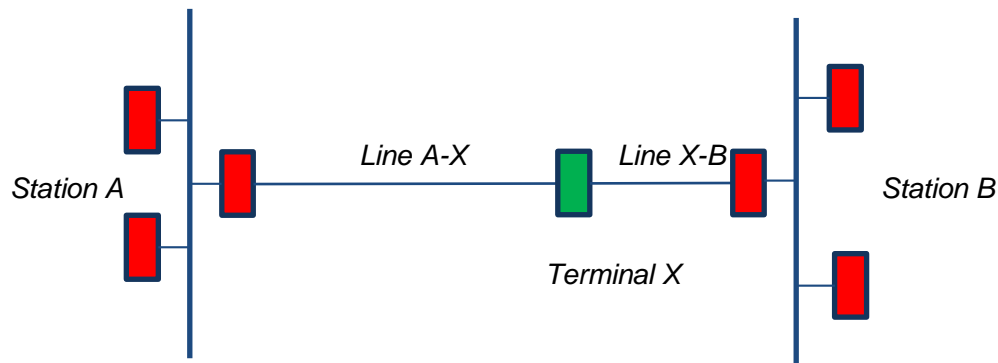
- Line A-B experiences a fault and Line B-C erroneously trips (relay overtrips) at Station C.
 - Line A-B – Dependent Mode Initiating Outage
 - Line B-C – Dependent Mode Outage



- Lightning strikes Line A-X:
 - Line A-X: Dependent Mode Initiating
 - Line X-B: Dependent Mode

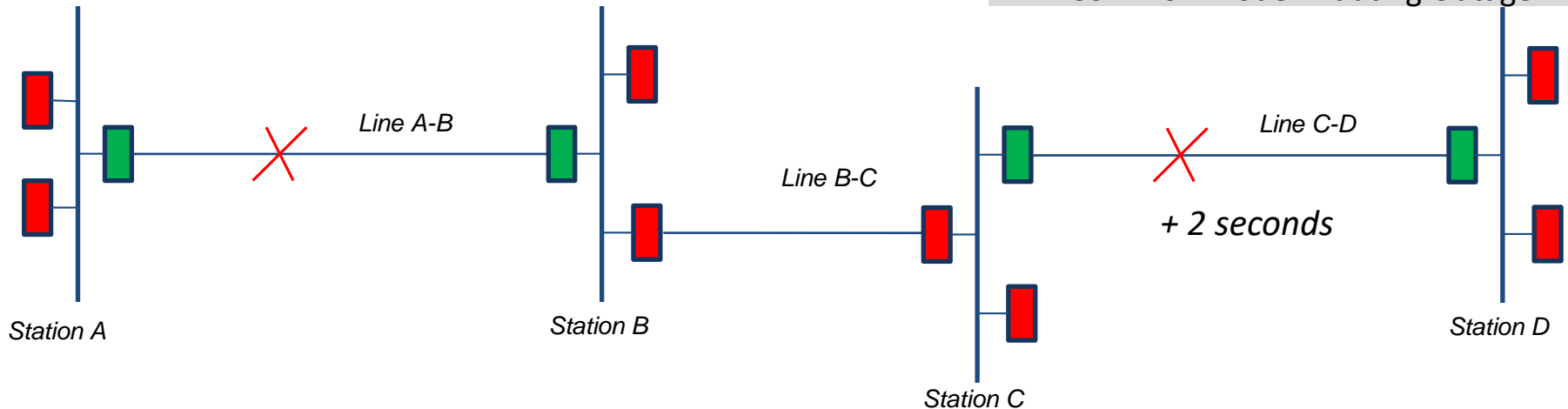


- Breaker at Terminal X trips due to low SF6 gas:
 - Line A-X: Common mode
 - Line X-B: Common mode



Lightning strikes Line A-B and Line C-D a few seconds apart. They don't share ROW or any equipment. All lines are BES elements.

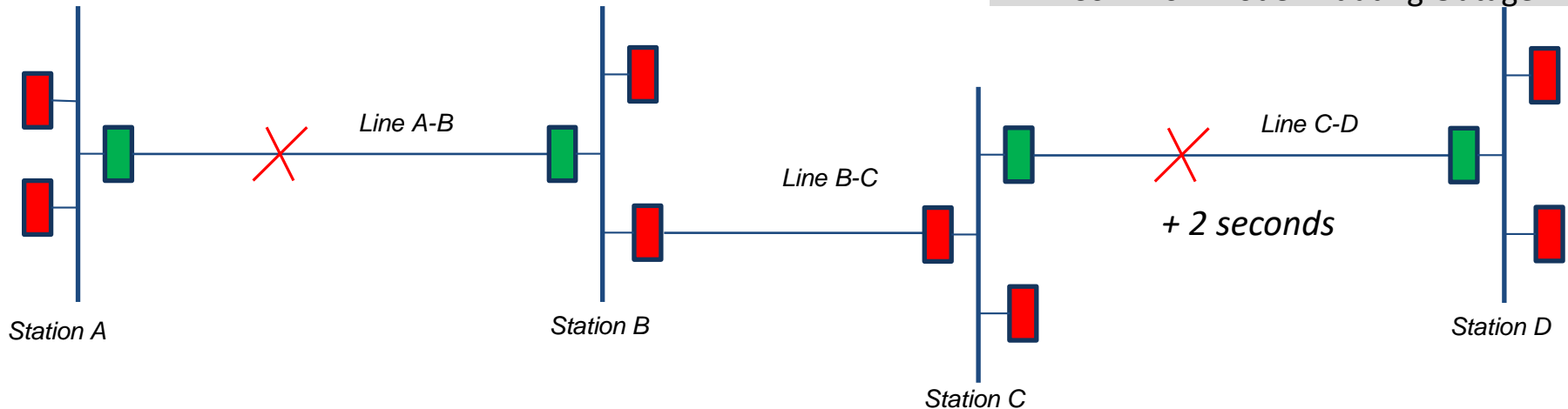
What is the Outage Mode Code for Line A-B?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Lightning strikes Line A-B and Line C-D a few seconds apart. They don't share ROW or any equipment. All lines are BES elements.

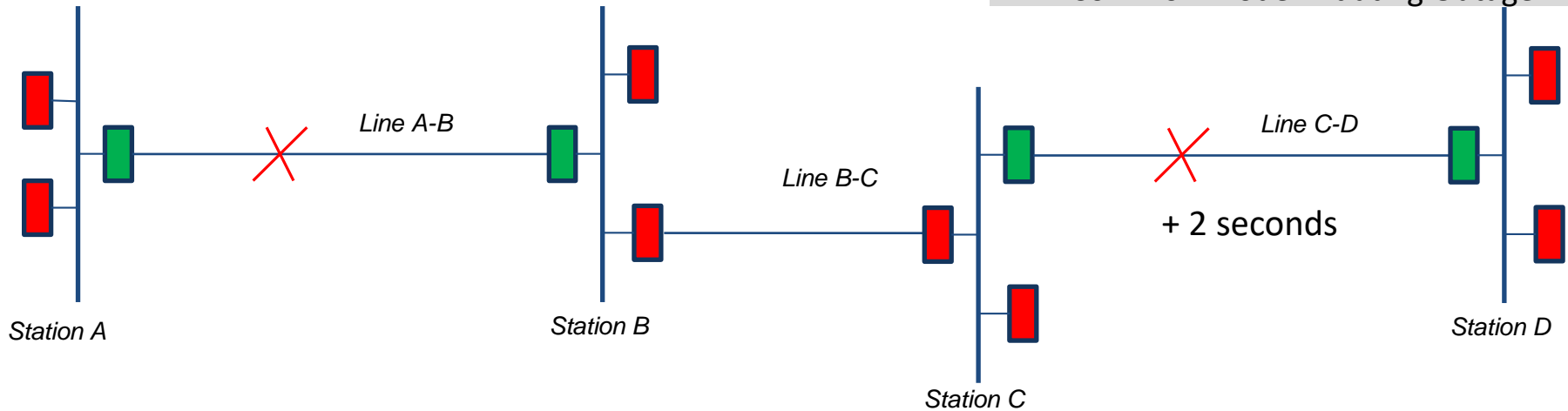
What is the Outage Mode Code for Line A-B?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Lightning strikes Line A-B and Line C-D a few seconds apart. They don't share ROW or any equipment. All lines are BES elements.

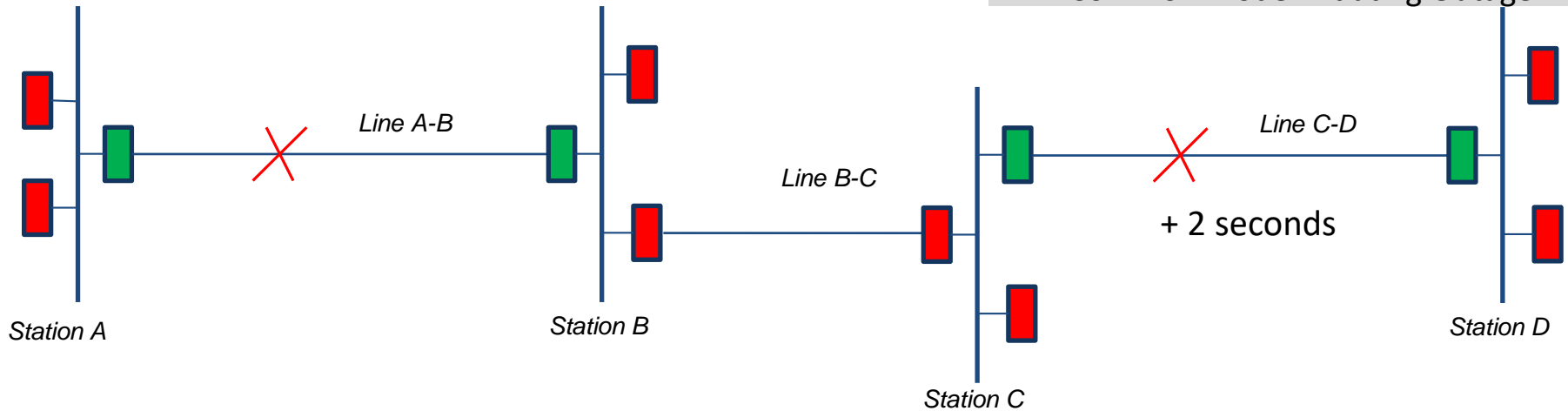
What is the Outage Mode Code for Line C-D?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Lightning strikes Line A-B and Line C-D a few seconds apart. They don't share ROW or any equipment. All lines are BES elements.

What is the Outage Mode Code for Line C-D?

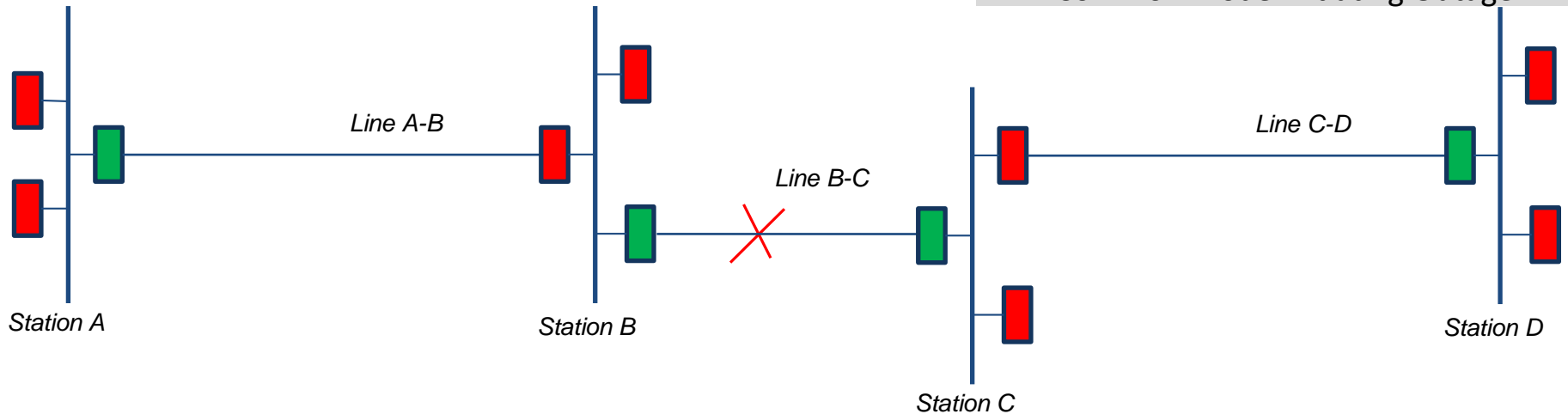


- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

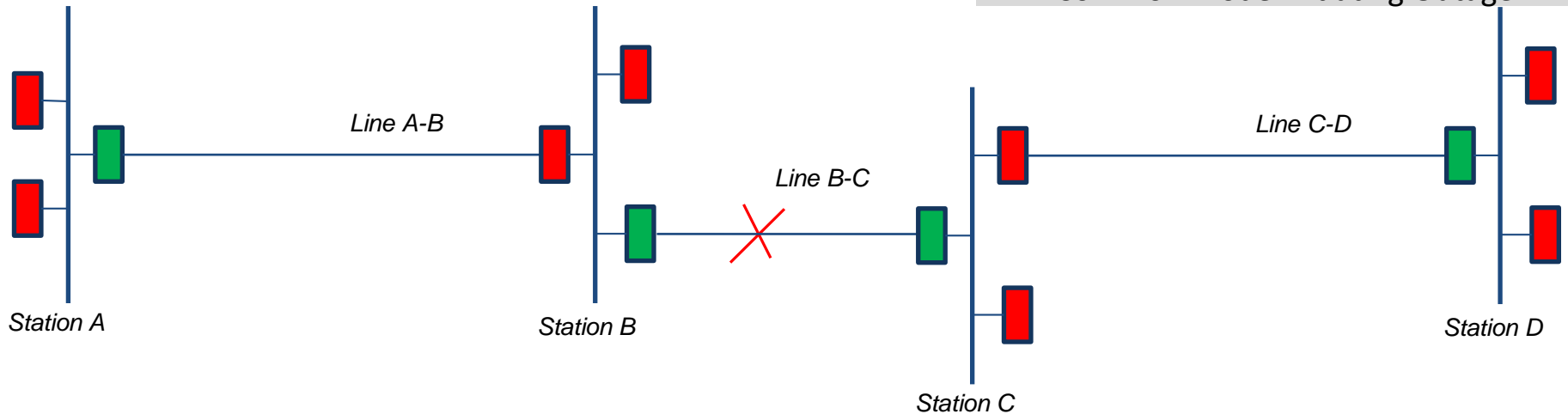
What is the Outage Mode Code for Line B-C?

- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage



Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

What is the Outage Mode Code for Line B-C?

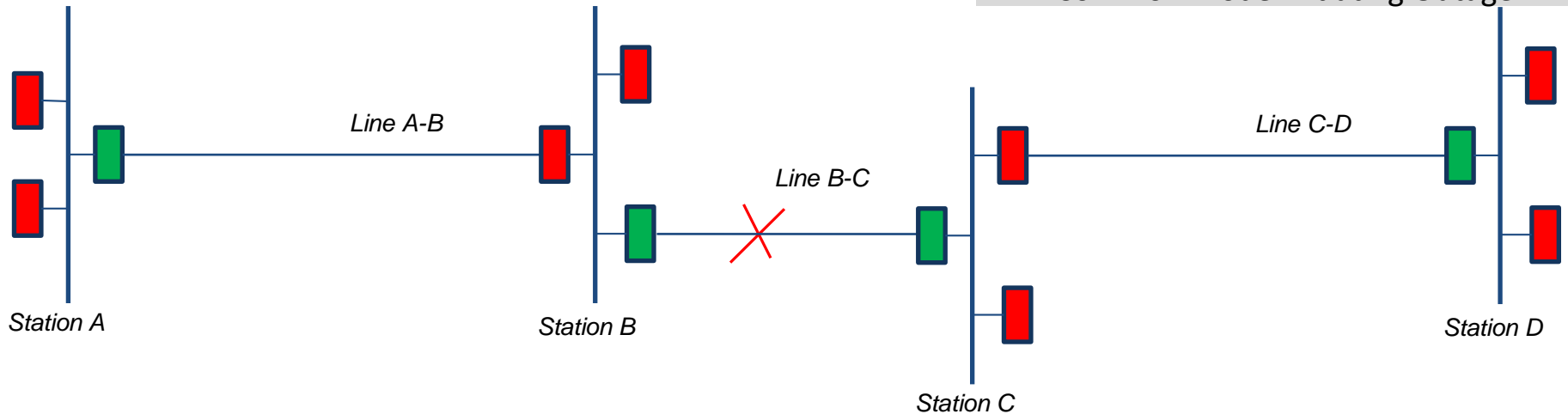


- A. Single Mode Outage
- B. Dependent Mode Initiating Outage**
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

What is the Outage Mode Code for Line A-B?

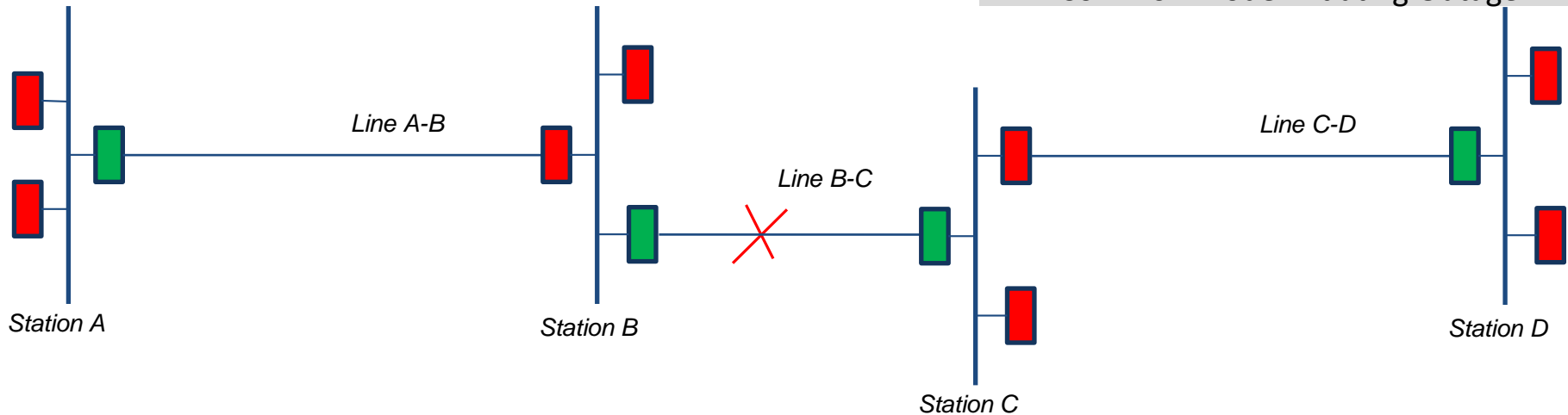
- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage



Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

What is the Outage Mode Code for Line A-B?

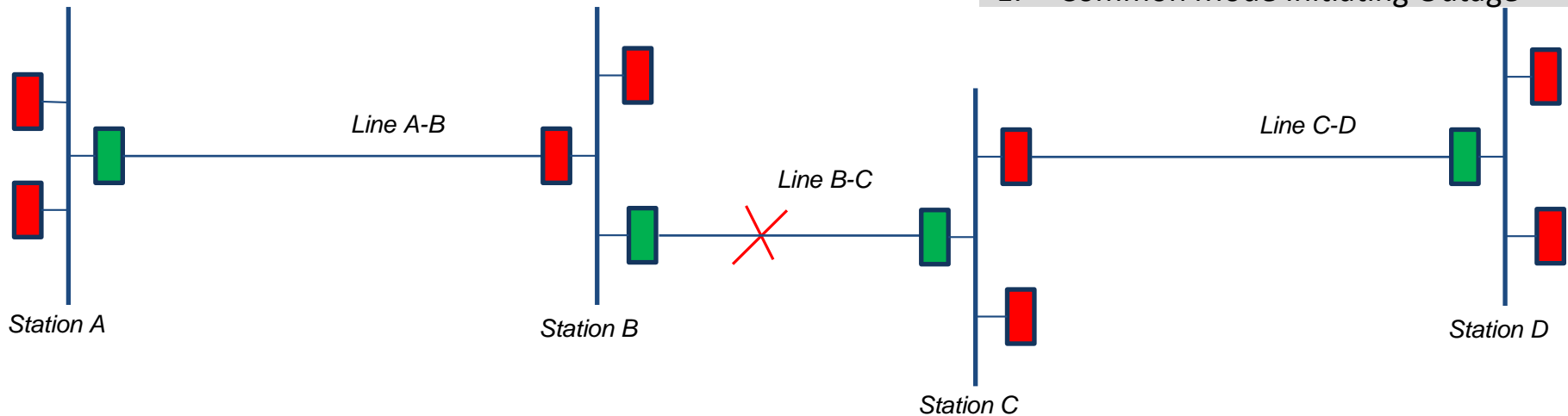
- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage**
- D. Common Mode Outage
- E. Common Mode Initiating Outage



Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

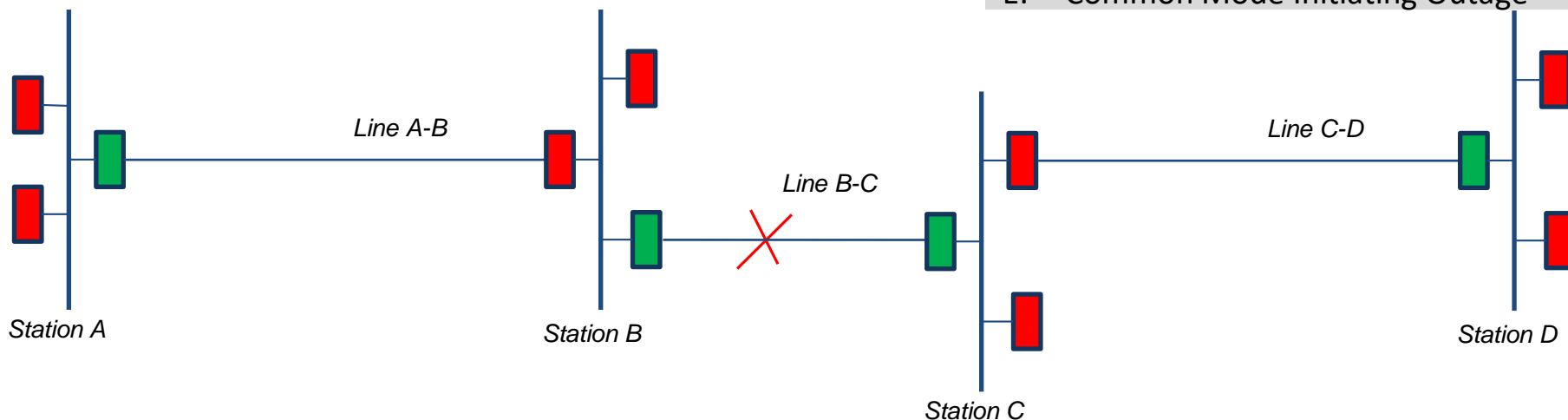
What is the Outage Mode Code for Line C-D?

- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage



Fault on Line B-C. Two separate relay issues (Protection System) at Station A and Station D. All lines are BES elements.

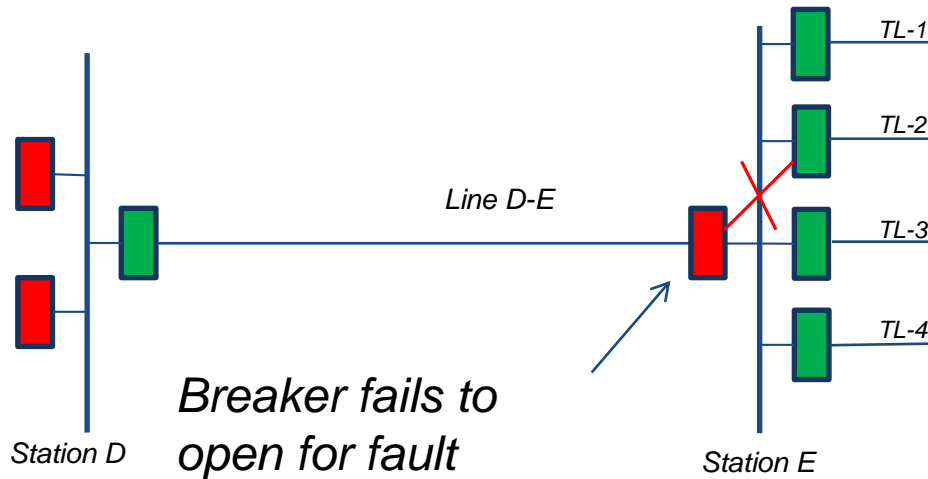
What is the Outage Mode Code for Line C-D?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage**
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Bus at Station E has fault. A relay on Line D-E misoperates. All lines are BES elements.

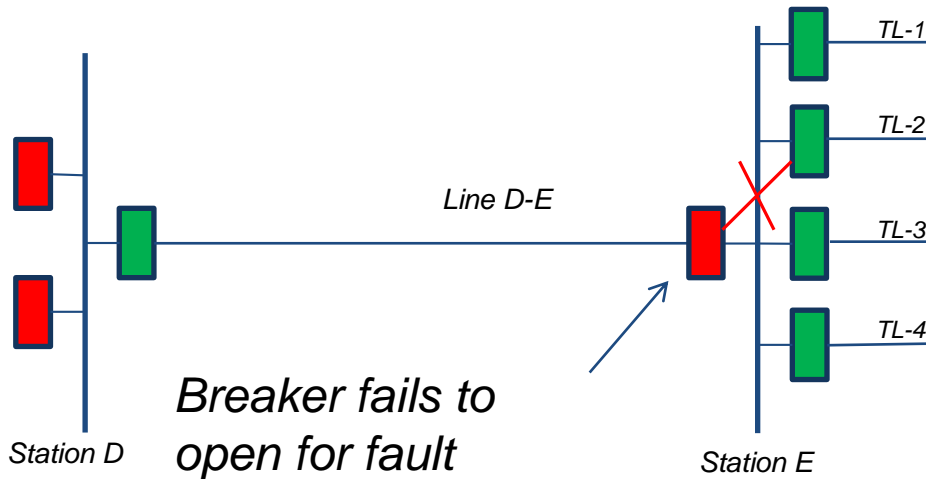
What is the Outage Mode Code for Line D-E?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Bus at Station E has fault. A relay on Line D-E misoperates. All lines are BES elements.

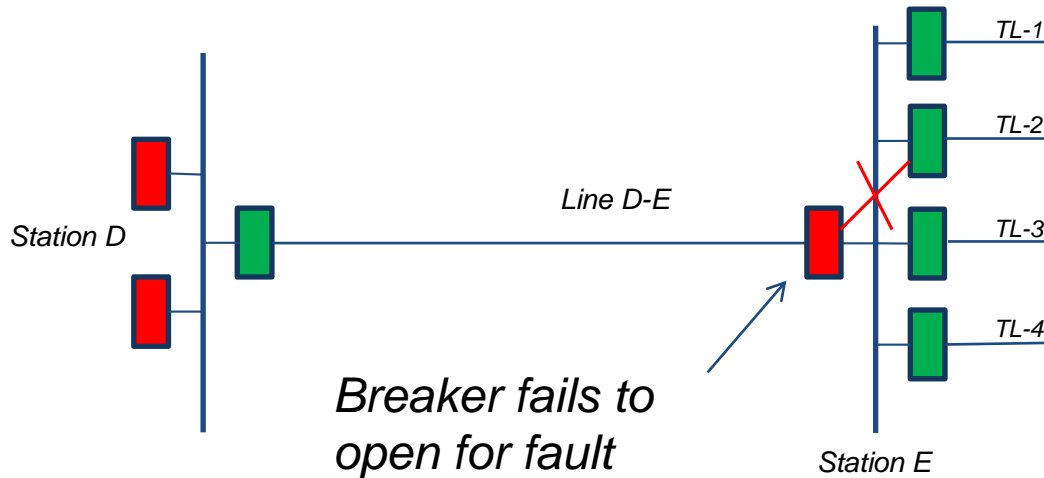
What is the Outage Mode Code for Line D-E?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage**
- E. Common Mode Initiating Outage

Bus at Station E has fault. A relay on Line D-E misoperates. All lines are BES elements.

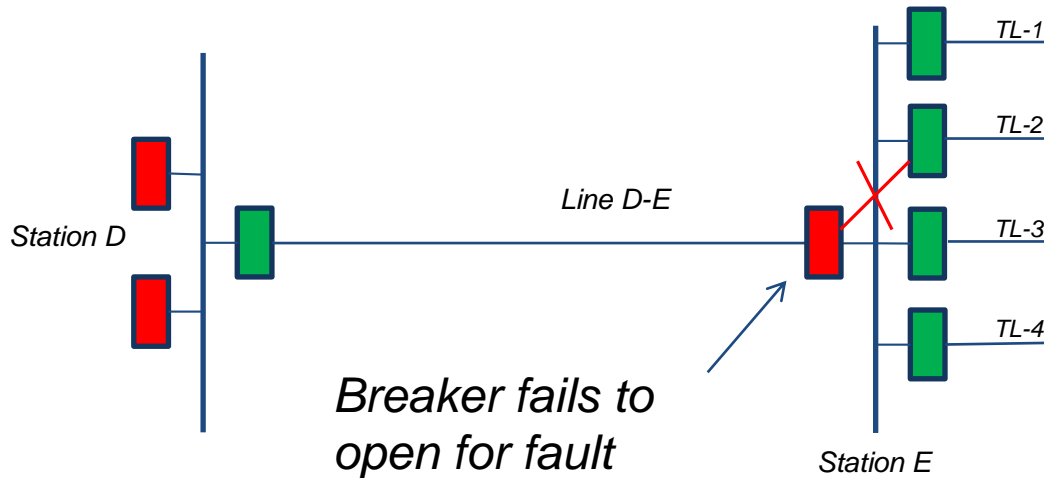
What is the Outage Mode Code for lines TL-1, TL-2...?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

Bus at Station E has fault. A relay on Line D-E misoperates. All lines are BES elements.

What is the Outage Mode Code for lines TL-1, TL-2...?



- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage**
- E. Common Mode Initiating Outage

A stylized map of North America, including the United States, Canada, and Mexico. The map is rendered in shades of blue and grey. A horizontal band of medium blue color passes behind the map, serving as a background for the title text.

Questions and Answers

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Outage ID and Event ID Codes

October 2020

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- A unique alphanumeric identifier assigned by the Transmission Owner (TO) to identify the reported outage of an Element.
- The Outage ID code is assigned by the TO
- Can be alphanumeric
- Must be unique across years (can't use the ID "Outage 1" in 2016 and then again in 2017)
- Examples: ACRO-YYYY-00000, INYY-00, YYYY_00000, or 00000 (where the number is usually from the entities outage system)

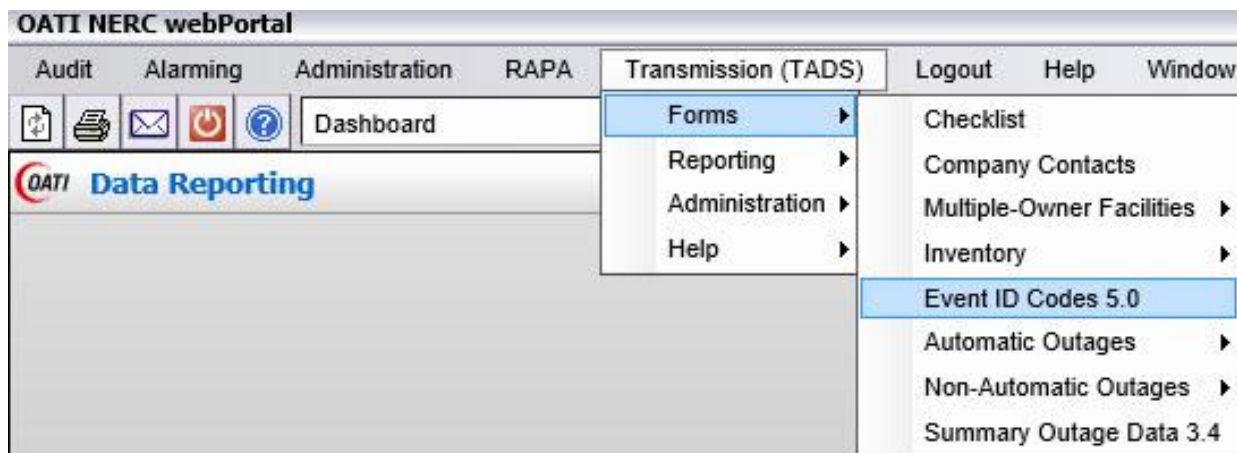
- **Momentary Outage:**
 - An Automatic Outage with an Outage Duration less than one minute.
 - If the circuit recloses and trips again within less than a minute of the initial outage, it is only considered one outage. The circuit would need to remain in service for longer than one minute between the breaker operations to be considered as two outages.
- **Sustained Outage:**
 - An Automatic Outage with an Outage Duration of a minute or greater.

- **Event Identification (ID) Code** - A unique alphanumeric identifier assigned by the TO to an Event.
 - 1. An Event associated with a Single Mode Outage will have just one Event ID Code.
 - 2. Each outage in a related set of two or more outages (e.g., Dependent Mode, Dependent Mode Initiating, Common Mode or Common Mode Initiating) shall be given the same Event ID Code.
 - Event ID should typically not be linked to multiple Single Mode Outages.
 - Correct examples include:
 - One Single Mode Outage; One Dependent Mode - Initiating and One or Multiple
 - Dependent Mode Outages; One Common Mode – Initiating and Multiple
 - Common Mode Outages; Two or more Common Mode Outages
 - Event ID would not include multiple separate trip and reclose due to weather caused galloping conductors

- Event ID Codes must be created on Form 5 before outages can be entered on Form 4.x.
- An Event associated with a Single Mode Outage will have one Event ID Code.
- Each outage in a related set of two or more outages (e.g., Dependent Mode, Dependent Mode Initiating, Common Mode, Common Mode Initiating) shall be given the same Event ID Code.
- For outages within a single TO, the TO assigns its own Event ID Code.

- webTADS tracks each TO's Event ID codes over multiple years and does not permit the same Event ID to be used twice by any given TO.
- Any pattern of alphanumeric characters may be used on Form 5 to define the Event ID code. Example: 1-2017 or A-2017
- Each year a new Form 4.x Outage ID Code is required, however, for outages due to an Event which started in the prior year, the prior year Form 5 Event ID code must be used on the current year Form 4.x.

- Click on **Transmission (TADS)**
- **Select Forms**
- **Select Event ID Codes 5.0**



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- Click on **Add Event ID Code**

OATI NERC webPortal Weisman, Kurt - (KurtWeisman)

Audit Alarming Administration RAPA **Transmission (TADS)** Logout Help Window

Dashboard x Event ID Codes (5.0) x WebTA Fri 11/17/2017 2:02 PM CPT

Event ID Codes (5.0) Reporting Period: 2017 Company: American Transmission Company (NCR00685) WebTA

	Event ID Code	Event Type Number	Event Description	Disturbance Report Filed	Case Study Assignment						Change Activity				Action
					TO Case 1	TO Case 2	RE Case 1	RE Case 2	NERC Case 1	NERC Case 2	Created on	Created By	Updated on	Updated By	
<input type="checkbox"/>	101-2017	13	Lighting	Not Known	-	-	-	-	-	-	11/17/2017 14:01 CST	KurtWeisman	11/17/2017 14:01 CST	KurtWeisman	Edit

11/17/2017 14:01:46 CST Page 3 of 3 Record 61 of 61

[Add Event ID Code](#)
[Import...](#)
[Import History](#)
[XML Export](#)
[Delete](#)
[Close](#)

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- Enter unique **Event ID Code**

Company Name:	American Transmission Company
Reporting Period:	2017 (01/01/2017 - 12/31/2017)
Event ID Code:	<input type="text" value="102-2017"/>
Event Type Number:	62 Security (unintended operation). ▾
Description:	<input type="text"/>
Disturbance Report Filed:	Not Known ▾

Case Study Assignment

- This Event ID Code can be saved as a member of one or more Case Studies below.
All Event IDs associated with a case study can be excluded from a report by using the report's filtering options.

TO Case 1:	<input type="checkbox"/>	TO Case 2:	<input type="checkbox"/>
RE Case 1:	<input type="checkbox"/>	RE Case 2:	<input type="checkbox"/>
NERC Case 1:	<input type="checkbox"/>	NERC Case 2:	<input type="checkbox"/>

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- *Select* correct **Event Type Number**

Company Name: American Transmission Company

Reporting Period: Please select one...

Event ID Code: 05 Single bus section fault or failure.
 06 Single internal circuit breaker fault.

Event Type Number: **11 Automatic Outage of a single Element.**
 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.
 49 Other Automatic Outage(s) with Normal Clearing.

Description: 60 Breaker Failure.
 61 Dependability (failure to operate).
 62 Security (unintended operation).
 90 Other Automatic Outage(s) with Abnormal Clearing.

Disturbance Report Filed: - This Event ID Code can be saved as a member of one or more Case Studies below.

All Event IDs associated with a case study can be excluded from a report by using the report's filtering options.

TO Case 1: **TO Case 2:**

RE Case 1: **RE Case 2:**

NERC Case 1: **NERC Case 2:**

Update History

Updated by: KurtWeisman **on** 11/20/2017 07:37 CST
Created by: KurtWeisman **on** 11/20/2017 07:37 CST

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- *Enter* brief **Description**
- Disturbance Report
- *Click* on **Enter**

Company Name: American Transmission Company
Reporting Period: 2017 (01/01/2017 - 12/31/2017)
Event ID Code: 102-2017
Event Type Number: 11 Automatic Outage of a single Element. ▼
Description:
Disturbance Report Filed: Not Known ▼

Case Study Assignment
- This Event ID Code can be saved as a member of one or more Case Studies below.
All Event IDs associated with a case study can be excluded from a report by using the report's filtering options.

TO Case 1: **TO Case 2:**
RE Case 1: **RE Case 2:**
NERC Case 1: **NERC Case 2:**

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- <https://www.oe.netl.doe.gov/OE417/Form/Home.aspx>

SYSTEM REPORT File within 1 Business Day	
<p>EMERGENCY ALERT File within 1 Hour</p> <p>If any box 1-8 on the right is checked, this form must be filed within 1 hour of the incident; check Emergency Alert (for the Alert Status) on Line A below.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> 1. Physical attack that causes major interruptions or impacts to critical infrastructure or to operations <input type="checkbox"/> 2. Cyber event that causes interruptions of electrical system operations <input type="checkbox"/> 3. Complete operational failure or shut-down of the transmission and/or distribution of electrical system <input type="checkbox"/> 4. Electrical System Separation (Islanding) where part or parts of power grid remain(s) operational in an otherwise blocked out area or within the partial failure of an integrated electrical system <input type="checkbox"/> 5. Uncontrolled loss of 300 Megawatts or more of firm system loads for 15 minutes or more from a single incident <input type="checkbox"/> 6. Firm load shedding of 100 Megawatts or more implemented under emergency operational policy <input type="checkbox"/> 7. System-wide voltage reductions of 3 percent or more <input type="checkbox"/> 8. Public appeal to reduce the use of electricity for purposes of maintaining the continuity of the Bulk Electric System
<p>NORMAL REPORT File within 6 Hours</p> <p>If any box 9-12 on the right is checked AND none of the boxes 1-8 are checked, this form must be filed within 6 hours of the incident; check Normal Report (for the Alert Status) on Line A below.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> 9. Physical attack that could potentially impact electric power system adequacy or reliability; or vandalism which targets components of any security systems <input type="checkbox"/> 10. Cyber event that could potentially impact electric power system adequacy or reliability <input type="checkbox"/> 11. Loss of electric service to more than 50,000 customers for 1 hour or more <input type="checkbox"/> 12. Fuel supply emergencies that could impact electric power system adequacy or reliability
<p>What is boxes n must be rs after dent OR iness day. ill be business (for the ow.</p>	<ul style="list-style-type: none"> <input type="checkbox"/> 13. Damage or destruction of a Facility within its Reliability Coordinator Area, Balancing Authority Area or Transmission Operator Area that results in action(s) to avoid a Bulk Electric System Emergency. <input type="checkbox"/> 14. Damage or destruction of its Facility that results from actual or suspected intentional human action. <input type="checkbox"/> 15. Physical threat to its Facility excluding weather or natural disaster related threats, which has the potential to degrade the normal operation of the Facility. Or suspicious device or activity at its Facility. <input type="checkbox"/> 16. Physical threat to its Bulk Electric System control center, excluding weather or natural disaster related threats, which has the potential to degrade the normal operation of the control center. Or suspicious device or activity at its Bulk Electric System control center. <input type="checkbox"/> 17. Bulk Electric System Emergency resulting in voltage deviation on a Facility; A voltage deviation of equal to or greater than 10% of nominal voltage sustained for greater than or equal to 15 continuous minutes. <input type="checkbox"/> 18. Uncontrolled loss of 200 Megawatts or more of firm system loads for 15 minutes or more from a single incident for entities with previous year's peak demand less than or equal to 3,000 Megawatts. <input type="checkbox"/> 19. Total generation loss, within one minute of: greater than or equal to 2,000 Megawatts in the Eastern or Western Interconnection or greater than or equal to 1,400 Megawatts in the ERCOT Interconnection. <input type="checkbox"/> 20. Complete loss of off-site power (LOOP) affecting a nuclear generating station per the Nuclear Plant Interface Requirements. <input type="checkbox"/> 21. Unexpected Transmission loss within its area, contrary to design, of three or more Bulk Electric System Facilities caused by a common disturbance (excluding successful automatic reclosing). <input type="checkbox"/> 22. Unplanned evacuation from its Bulk Electric System control center facility for 30 continuous minutes or more. <input type="checkbox"/> 23. Complete loss of Interpersonal Communication and Alternative Interpersonal Communication capability affecting its staffed Bulk Electric System control center for 30 continuous minutes or more. <input type="checkbox"/> 24. Complete loss of monitoring or control capability at its staffed Bulk Electric System control center for 30 continuous minutes or more.

- Click on **OK**

The screenshot shows a web form for creating a new Event ID Code. The form fields are: Company Name: American Transmission Company; Reporting Period: 2017 (01/01/2017 - 12/31/2017); Event ID Code: 102-2017; Event Type Number: 11 Automatic Outage of a single Element.; Description: Lightning; Disturbance Report Filed: Not Known. Below these fields is a 'Case Study Assignment' section with the following text: '- This Event ID Code can be saved as a member of one or more Case Studies below. All Event IDs associated with a case study can be excluded from a report by using the report's filtering options.' The assignment options are: TO Case 1: TO Case 2: ; RE Case 1: RE Case 2: ; NERC Case 1: NERC Case 2: . At the bottom of the form are buttons for Enter, Delete, Audit, and Close. A confirmation dialog box titled 'Message from webpage' is overlaid on the bottom half of the form, containing a question mark icon and the text: 'You are about to create Event ID Code. Do you want to continue?' with OK and Cancel buttons.

*Case Study Assignment:
Allows the TO, RE or NERC to checkmark multiple events and then filter based on selected events for a special report e.g. Polar Vortex report*

Note: Events have to be manually unchecked after case study is complete.

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- A new **Event ID Code** is created

OATI NERC webPortal Weisman, Kurt - (KurtWeisman)

Audit Alarming Administration RAPA **Transmission (TADS)** Logout Help Window

Dashboard x Event ID Codes (5.0) x Fri 11/17/2017 2:08 PM CPT

OATI Event ID Codes (5.0) Reporting Period: 2017 Company: American Transmission Company (NCR00685)

	Event ID Code	Event Type Number	Event Description	Disturbance Report Filed	Case Study Assignment					Change Activity				Action	
					TO Case 1	TO Case 2	RE Case 1	RE Case 2	NERC Case 1	NERC Case 2	Created on	Created By	Updated on		Updated By
<input type="checkbox"/>	101-2017	13	Lightning	Not Known	-	-	-	-	-	-	11/17/2017 14:01 CST	KurtWeisman	11/17/2017 14:01 CST	KurtWeisman	Edit
<input type="checkbox"/>	102-2017	11	Lightning	Not Known	-	-	-	-	-	-	11/17/2017 14:08 CST	KurtWeisman	11/17/2017 14:08 CST	KurtWeisman	Edit

11/17/2017 14:08:05 CST Page 3 of 3 Records 61-62 of 62

[Add Event ID Code](#) [Import...](#) [Import History](#) [XML Export](#) [Delete](#) [Close](#)

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- Click on **Edit** to *modify* existing **Event Code ID**

OATI NERC webPortal Weisman, Kurt - (KurtWeisman)

Audit Alarming Administration RAPA **Transmission (TADS)** Logout Help Window

Dashboard Event ID Codes (5.0) Fri 11/17/2017 2:08 PM CPT

Event ID Codes (5.0) Reporting Period: 2017 Company: American Transmission Company (NCR00685)

	Event ID Code	Event Type Number	Event Description	Disturbance Report Filed	Case Study Assignment						Change Activity				Action
					TO Case 1	TO Case 2	RE Case 1	RE Case 2	NERC Case 1	NERC Case 2	Created on	Created By	Updated on	Updated By	
<input type="checkbox"/>	101-2017	13	Lightning	Not Known	-	-	-	-	-	-	11/17/2017 14:01 CST	KurtWeisman	11/17/2017 14:01 CST	KurtWeisman	Edit
<input type="checkbox"/>	102-2017	11	Lightning	Not Known	-	-	-	-	-	-	11/17/2017 14:08 CST	KurtWeisman	11/17/2017 14:08 CST	KurtWeisman	Edit

11/17/2017 14:08:05 CST Page 3 of 3 Records 61-62 of 62

Add Event ID Code Import... Import History XML Export Delete Close

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- *Modify* data as needed
- Click on **Modify**

Company Name: American Transmission Company
Reporting Period: 2017 (01/01/2017 - 12/31/2017)
Event ID Code:
Event Type Number: 62 Security (unintended operation).
Description:
Disturbance Report Filed:

Case Study Assignment

- This Event ID Code can be saved as a member of one or more Case Studies below.
All Event IDs associated with a case study can be excluded from a report by using the report's filtering options.

TO Case 1: **TO Case 2:**
RE Case 1: **RE Case 2:**
NERC Case 1: **NERC Case 2:**

Update History

Updated by: KurtWeisman **on** 11/20/2017 07:38 CST
Created by: KurtWeisman **on** 11/20/2017 07:38 CST

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- Click on **OK**

The screenshot shows a web application interface for editing an Event ID Code. The form contains the following fields:

- Company Name:** American Transmission Company
- Reporting Period:** 2017 (01/01/2017 - 12/31/2017)
- Event ID Code:** 102-2017
- Event Type Number:** 62 Security (unintended operation).
- Description:** System Protection
- Disturbance Report Filed:** Not Known

Below the form is a section titled **Case Study Assignment** with the following text:

- This Event ID Code can be saved as a member of one or more Case Studies below.
All Event IDs associated with a case study can be excluded from a report by using the report's filtering options.

There are four checkboxes for case study assignments:

- TO Case 1:**
- TO Case 2:**
- RE Case 1:**
- RE Case 2:**
- NERC Case 1:**
- NERC Case 2:**

Below the checkboxes is an **Update History** section:

- Updated by:** KurtWeisman on 11/20/2017 07:38 CST
- Created by:** KurtWeisman on 11/20/2017 07:38 CST

At the bottom of the form are buttons for **Modify**, **Delete**, **Audit**, and **Close**.

A confirmation dialog box titled "Message from webpage" is overlaid on the bottom half of the form. It contains a question mark icon and the text: "You are about to modify Event ID Code. Do you want to continue?". At the bottom of the dialog are **OK** and **Cancel** buttons.

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- **Event ID Code is Modified**

OATI NERC webPortal Weisman, Kurt - (KurtWeisman)

Audit Alarming Administration RAPA **Transmission (TADS)** Logout Help Window


Dashboard x Event ID Codes (5.0) x System Fri 11/17/2017 2:13 PM CPT

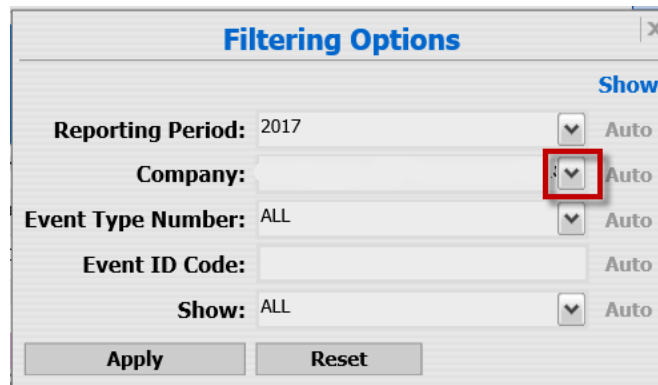
OATI Event ID Codes (5.0) Reporting Period: 2017 Company: American Transmission Company (NCR00685)

	Event ID Code	Event Type Number	Event Description	Disturbance Report Filed	Case Study Assignment					Change Activity				Action	
					TO Case 1	TO Case 2	RE Case 1	RE Case 2	NERC Case 1	NERC Case 2	Created on	Created By	Updated on		Updated By
<input type="checkbox"/>	101-2017	13	Lighting	Not Known	-	-	-	-	-	-	11/17/2017 14:01 CST	KurtWeisman	11/17/2017 14:01 CST	KurtWeisman	Edit
<input type="checkbox"/>	102-2017	62	System Protection	Not Known	-	-	-	-	-	-	11/17/2017 14:08 CST	KurtWeisman	11/17/2017 14:13 CST	KurtWeisman	Edit

11/17/2017 14:13:29 CST Page 3 of 3 Records 61-62 of 62

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- TOs (or Regional Entities) coordinate a unique NERC wide (NMU) Event ID code on Form 5 if outages affect two or more Reporting TO's. NMUs are only for automatic outages where multiple reporting TOs are entering data on 4.X forms.
 - *Open Form 5*
 - *Click the **Filter Options** Icon  on the right hand side of the screen*
 - In the **Filtering Options** menu *click the **Company** drop down menu and select “NERC Event ID Codes”*
 - *Click **Apply***



Filtering Options [X]

Reporting Period: 2017 [dropdown] Auto

Company: [dropdown] Auto

Event Type Number: ALL [dropdown] Auto

Event ID Code: [input] Auto

Show: ALL [dropdown] Auto

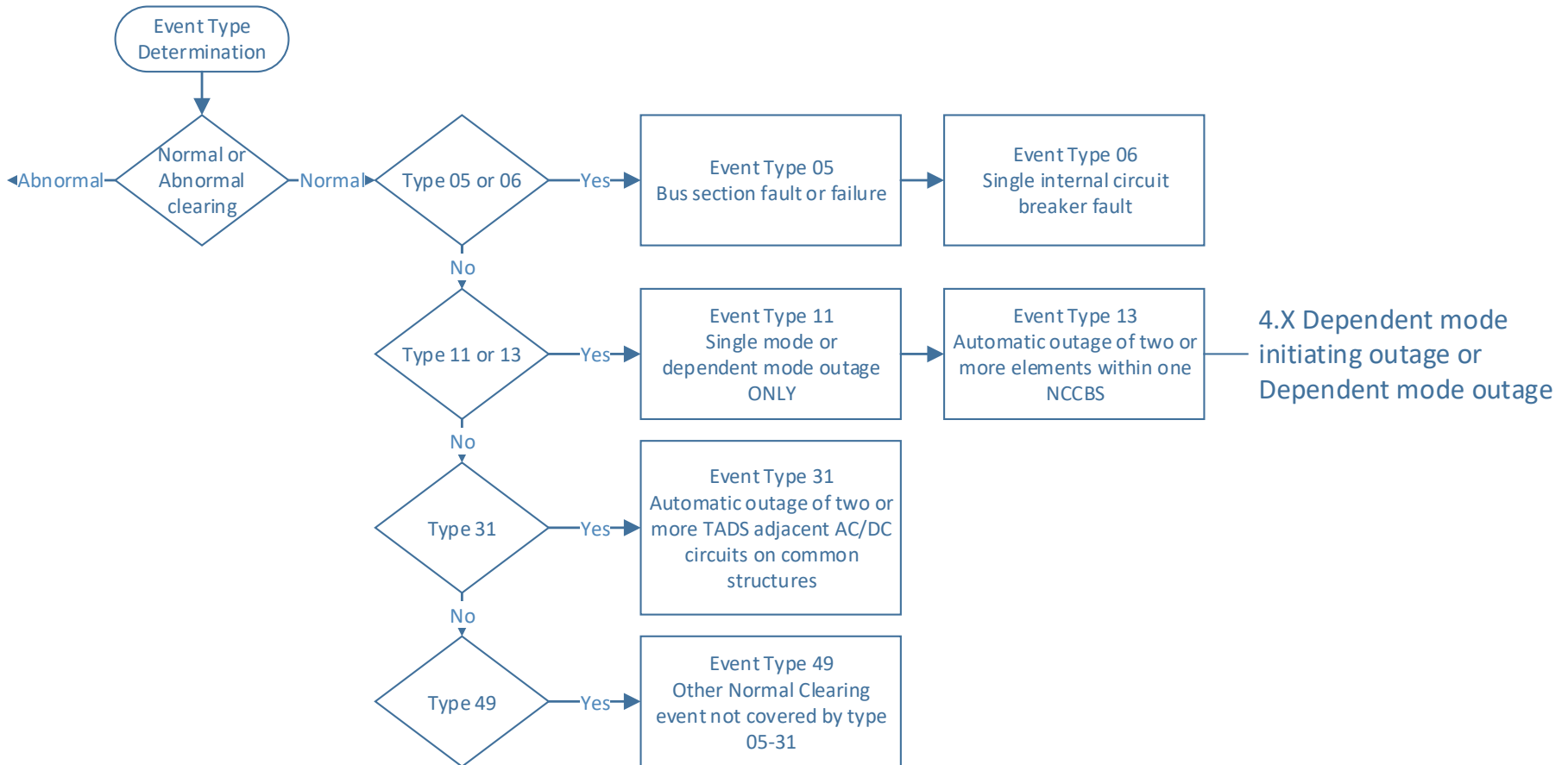
Apply Reset

- Click **“Add Event ID Code”** to create the next NMU number
- Fill out the **form** and *share* the **NMU** with the other effected TOs
 - NOTE: The Event ID Code, Event Type number and event description will be public to any TO in TADS but the TO information will remain confidential.

Event ID Code	Event Type Number	Description
NMU00407-2017	13	Russell Dam Corp of Engineers indicated that a 230kV bushing flashed on a breaker due to a large swarm of Mayflies.
NMU00408-2017	13	Russell Dam Corp of Engineers indicated that a 230kV bushing flashed on a breaker due to a large swarm of Mayflies.
NMU00409-2017	13	Caused by the severe weather from Hurricane Irma.
NMU00410-2017	11	1 op and reclose @ St John only (Targets: 87, Zone 1). RMS did not reclose due to sync conditions.

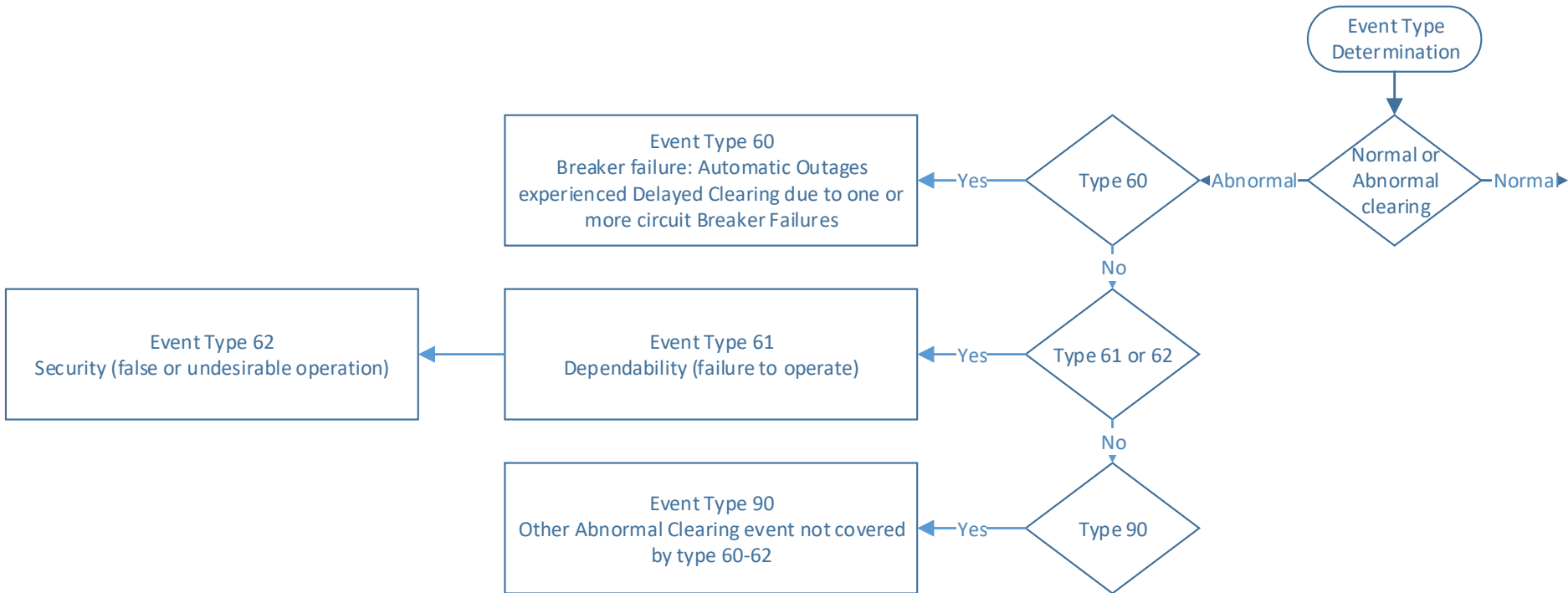
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Event Type No.	Description
5	Single bus section fault or failure resulting in one or more Automatic Outages.
6	Single internal circuit breaker fault resulting in one or more Automatic Outages.
11	Automatic Outage of a single Element not covered by Event Type Numbers 05 and 06.
13	Automatic Outage of two or more Elements within one 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.



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 failure of a single Protection System (primary or secondary backup) under either of these conditions: a. failure to initiate the isolation of a faulted power system Element as designed, or within its designed operating time, or b. 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 above.

Event Type – Abnormal Clearing



Which of these isn't an actual event code?

Event Type Number Descriptions: Events with Normal Clearing

Choice	Event Type No.	Description
A	5	Single bus section fault or failure resulting in one or more Automatic Outages.
B	6	Single internal circuit breaker fault resulting in one or more Automatic Outages.
C	11	Automatic Outage of a single Element not covered by Event Type Numbers 05 and 06.
D	13	Automatic Outage of two or more Elements within one NCCBS.
E	21	Automatic Outage of two or more Elements within two NCCBS.
F	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.
G	49	Automatic Outage(s) with Normal Clearing not covered by Event Type Numbers 05 through 31 above.

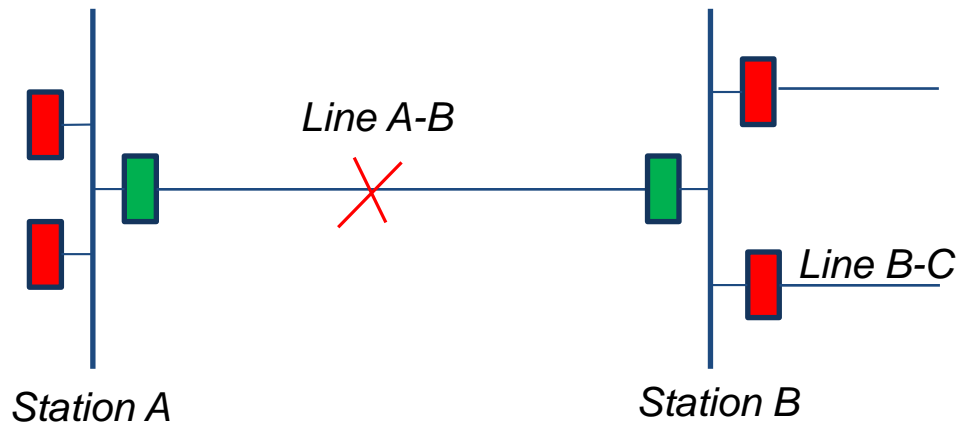
Which of these isn't an actual event code?

Event Type Number Descriptions: Events with Abnormal Clearing

Choice	Event Type No.	Description
A	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.
B	61	Dependability (failure to operate): One or more Automatic Outages with Delayed Fault Clearing due to failure of a single Protection System (primary or secondary backup) under either of these conditions: a. failure to initiate the isolation of a faulted power system Element as designed, or within its designed operating time, or b. 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.)
C	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.
D	63	Bus Failure: Improper operation of a Protection System resulting in a Single Bus section interruption.
E	90	Automatic Outage(s) with Abnormal Clearing not covered above.

A fault occurs on Line A-B.

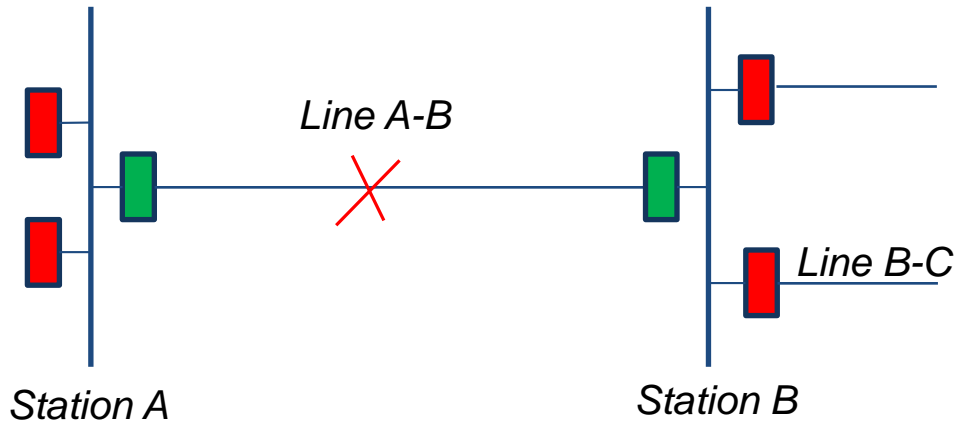
What is the Event Type No. for the Event?



- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 13 – Two or more Elements within one NCCBS.
- E. 31 – Two or more adjacent AC Circuits on common structures
- F. 60 – Breaker Failure to Operate

A fault occurs on Line A-B.

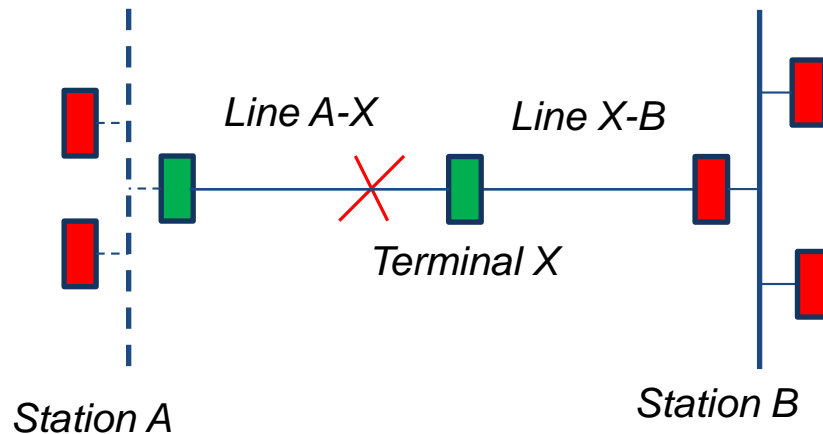
What is the Event Type No. for the Event?



- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 13 – Two or more Elements within one NCCBS.
- E. 31 – Two or more adjacent AC Circuits on common structures
- F. 60 – Breaker Failure to Operate

A fault on AC Circuit 'A-X'.

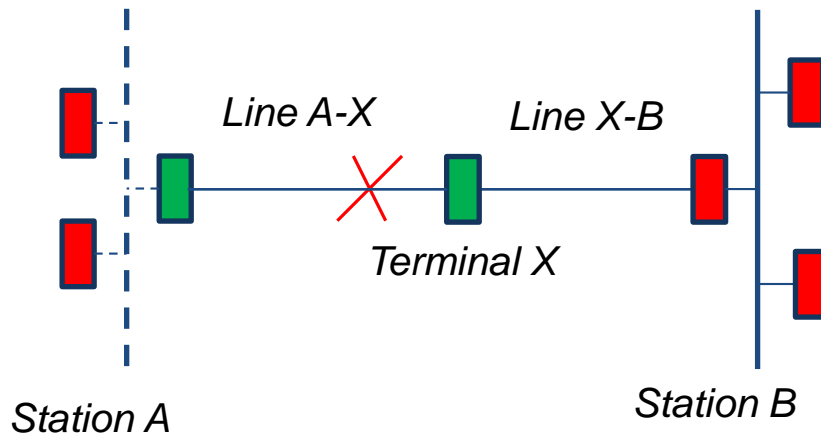
What is the Event Type No. for the Event?



- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 13 – Two or more Elements within one NCCBS.
- E. 31 – Two or more adjacent AC Circuits on common structures
- F. 60 – Breaker Failure to Operate

A fault on AC Circuit 'A-X'.

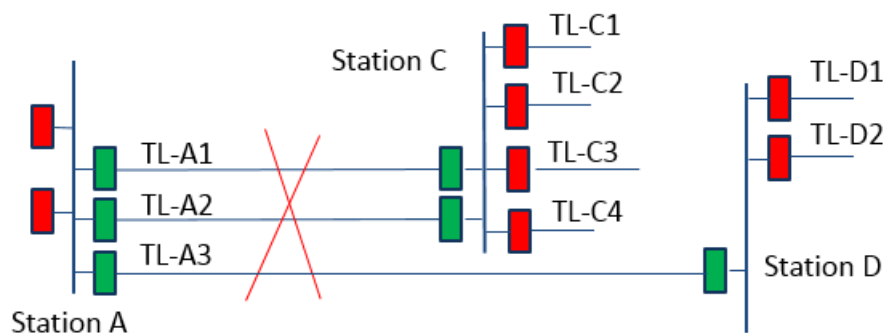
What is the Event Type No. for the Event?



- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 13 – Two or more Elements within one NCCBS.**
- E. 31 – Two or more adjacent AC Circuits on common structures
- F. 60 – Breaker Failure to Operate

Tornado destroys a rivers crossing tower shared by 3 lines.

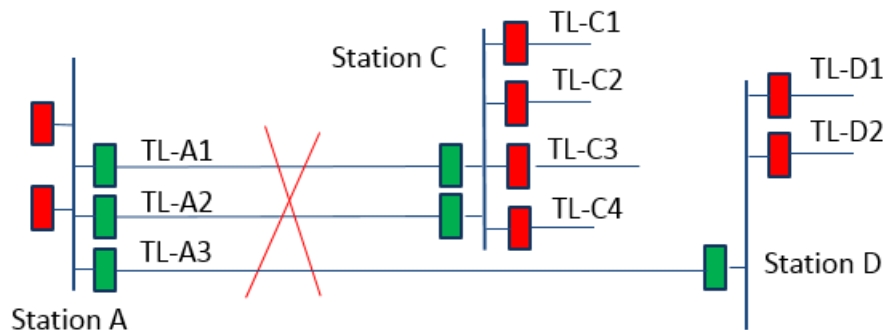
What is the Event Type No. for the Event?



- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 31 – Two or more adjacent AC Circuits on common structures
- E. 60 – Breaker Failure to Operate
- F. 61 – Dependability – Failure to Operate

Tornado destroys a rivers crossing tower shared by 3 lines.

What is the Event Type No. for the Event?



- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 31 – Two or more adjacent AC Circuits on common structures**
- E. 60 – Breaker Failure to Operate
- F. 61 – Dependability – Failure to Operate



Questions and Answers

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NERC

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October 2020

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