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Transmission Availability Data System Reporting Training

October 2023

RELIABILITY | RESILIENCE | SECURITY



- Learning Objectives
 - 01 Overview and Use of Data
 - 02 Data Entry Demo
 - 03 Checklist Completion
 - 04 In Service State / TADS Reportable
 - 05 Outage Types: Automatic vs Operational and Momentary vs Sustained
 - 06 Outage Initiation Codes
 - 07 Cause Codes: Initiating (ICC) and Sustained (SCC)
 - 08 Fault Types
 - 09 Outage Modes
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 - 11 Jointly Owned Lines/NMU Numbers
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TADS Overview and Use of Data

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Who needs to report TADS?

- 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

What is being collected through TADS?

- 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)
- Data due 45 calendar days after end of each quarter

TADS Website: NERC and Regional Entities contacts




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

Link to OATI NERC TADS Portal



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About NERC
Career Opportunities
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Event Analysis

- Event Analysis
- Lessons Learned
- Event Reports
- EA Program

Human Performance

Modeling Assessments

Reliability Assessments

Performance Analysis

Section 1600 Data Requests

Reliability Indicators

Demand Response Availability Data System (DADS)

Generating Availability Data System (GADS)

Geomagnetic Disturbance Data (GMD)

Transmission Availability Data System (TADS)

Misoperation Information Data Analysis System (MIDAS)

Electricity Supply & Demand (ES&D)

Bulk Electric System Definition, Notification, and Exception Process Project

Committees

- Reliability and Security Technical Committee (RSTC)

Webinars

Home > Program Areas & Departments > Event Analysis, Reliability Assessment, and Performance Analysis > Transmission Availability Data System (TADS)

Transmission Availability Data System (TADS)

On October 23, 2007, the NERC Board of Trustees (Board) approved the collection of the Phase I TADS data, beginning in calendar year 2008. On October 29, 2008, the Board approved the collection of Phase II TADS Non-Automatic Outage Data, beginning in 2010. TAD collects transmission outage data in a common format for:

1. Bulk Electric System AC Circuits (Overhead and Underground)
2. Transmission Transformers (No Generator Step-up Units)
3. Bulk Electric System AC/DC Back-to-Back Converters
4. Bulk Electric System DC Circuits

TADS efforts began in 2006 with the formation of the TADS Task Force under the NERC Planning Committee. This task force designed TADS and the associated processes for collecting TADS data. On June 30, 2009, the task force issued its first reports for data collected in 2008. On July 1, 2009, the task force was retired and replaced with the TADS Working Group. This change recognized the ongoing design and oversight of TADS that is more appropriately assigned to a working group than a task force. NERC uses the information to develop transmission metrics that analyze outage frequency, duration, causes, and many other factors related to transmission outages.

In 2020, the TADS Working Group became the TADS User Group (TADSUG). The TADSUG performs the same functions as the TADSWG. However, it no longer reports into the NERC Committee structure. Instead, it reports to the NERC Performance Analysis Department.

While TADS is not intended to provide determinative performance measures, it is used to quantify certain performance aspects. In addition to collecting simple transmission equipment availability, TADS will collect detailed information about individual outage events that, when analyzed at the Regional and NERC level, will provide data that may be used to improve reliability.

All TADS-related material is available for download from the [TADS User Group](#).

For more information, please contact tads@nerc.net

TADS Data Reporting Instructions (DRI)

Type	Title	Date
Key TADS Documents (2)		
	2023 TADS DRI	1/20/2023
	TADS Reporting Workbook	8/26/2022
webTADS Application Updates (9)		
	TADS Multi-Owner Inventory Update Instructions	11/2/2022
	TADS Application Enhancements August 2022	8/26/2022
	TADS Application Enhancements November 2020	11/19/2020
	TADS Application Enhancements February 2020	5/11/2020
	TADS Application Enhancements July 2018	10/31/2018
	TADS Application Enhancements February 2017	3/1/2017
	TADS Application Enhancements November 2016	2/6/2017
	TADS Section 1600 Request: Comments and Responses Proposed Element Inventory and Quarterly Data	12/1/2012
	TADS Section 1600 Request: Comments and Responses Proposed Outage Data Collection for BES Elements Operated at Less Than 200 kV	12/1/2012

TADS News

TADS Training (In-Person) - October 18-19, 2023

Data Submission

Deadlines for Data Submission into WebTADS are:

Reporting Deadline*	Period of Operation to Report
February 15	Any updates for the prior year
May 15	Quarter 1: January 1 - March 31
August 15	Quarter 2: April 1 - June 30
November 15	Quarter 3: July 1 - September 30
February 15	Quarter 4: October 1 - December 31

*When a deadline falls on a weekend or holiday, reporting will be extended through the following business day.

Program Contacts



NERC	MRO	NPCC	RF
SERC	Texas RE	WECC	

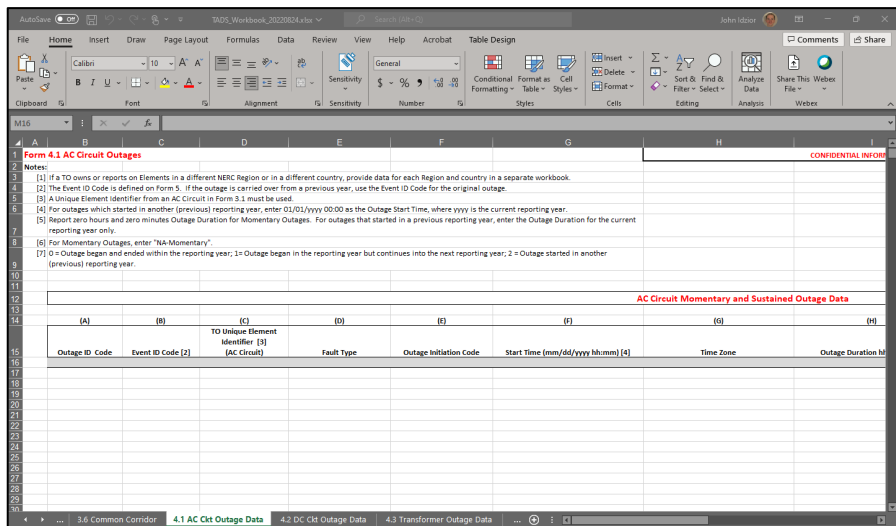
Key Links

- [OATI - How to set up an account](#)
- [OATI TADS NERC Portal login](#)
- [Transmission Availability Data System User Group \(TADSUG\)](#)
- Training**
- [Data Quality Control Process](#)
- [TADS Phase II Final Report](#)
- [TADS Section 1600 Data Request Planned Outages](#)
- Dashboards**
- [Element Inventory Dashboard](#)
- [Sustained Outages by Cause Code Dashboard](#)
- [Momentary Outages by Cause Code Dashboard](#)
- [Momentary and Sustained Outages by Month Dashboard](#)
- [TADS Dashboard Supporting Data](#)

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

TADS Data Reporting Instructions (DRI)

Type	Title	Date
Key TADS Documents (2)		
	2023 TADS DRI	1/20/2023
	TADS Reporting Workbook	8/26/2022



Key Links

[OATI - How to set up an account](#)

[OATI TADS NERC Portal login](#)

[Transmission Availability Data System User Group \(TADSUG\)](#)

[Training](#)

[Data Quality Control Process](#)

[TADS Phase II Final Report](#)

[TADS Section 1600 Data Request Planned Outages](#)

TADS User Group (TADSUG)

- Chair: John Idzior (RF) Vice Chair: Nick DePompei (SERC)
- 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)

Where is TADS Data Being Used?

Annual NERC State of Reliability (SOR) Report

- Key Findings
- Reliability Indicators
- Chapter 2: Severe Risks, Impact, and Resilience
- Chapter 5: Adequate Level of Reliability Performance Objectives



NERC Performance Metric Dashboards – TADS Public Site

Technical & Statistical Papers

- Impact of Extreme Weather on North American Transmission System Outages (IEEE, 2019)
- Assessment of North American Transmission Outages by Fault Type (IEEE, 2020)
- Use of Transmission Line Outage History for Probabilistic Transmission Risk Assessment (IEEE PMAPS, 2020)
- Impact of Extreme Weather on North American Transmission System Outages (IEEE, 2021)

Region reports and assessments

- MRO – Summer & Winter Reliability Assessments, Protection Relay Subcommittee Metrics
- NPCC – Entity Risk Assessment, Reliability Metrics
- ReliabilityFirst – Annual Regional Risk Assessment, Internal Reliability Dashboards
- SERC – Entity Dashboard, Entity Risk Profile
- TRE – Annual Assessment Reliability Report
- WECC – State of the Interconnection Data Portal, Reliability Assessments, Internal Reliability Dashboards

Entity Uses

- Outage/performance metrics

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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Data Entry Demonstration

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Manual and Bulk Upload Examples

- Add Line to Inventory
 - Form 3.1
 - Form 2.1 – Jointly Owned Lines
- Create Event ID
 - Form 5.0
- Create Line Outage
 - Form 4.1

GUI Line Entry

- Circuit Type: ACO - AC Overhead
- kV: 100-199 kV
- Element Identifier: 1120
- From Bus: Bear Rd.
- To Bus: Rocky Mountain
- Circuit Miles: 8
- BES Exempted Flag: 0
- In Service: 1/1/2023
- Number of Terminals: 2

Bulk Upload Line Entry

- Unique Element Identifier: 1130
- Voltage Class: 100-199 kV
- Circuit Type: ACO - AC Overhead
- From Bus: Home
- To Bus: Depot
- Circuit Miles: 25
- Number of Terminals: 2
- Change/Reconfiguration Date: 1/1/2023
- BES Exempted Flag: 0

GUI Event Entry

- Event ID Code: Event 9
- Event Type No: 11
- Description: Failed Insulator
- Disturbance Report Filed: No

Bulk Upload Event Entry

- Event ID Code: Event 10
- Event Type No: 11 (Automatic Outage of a single Element)
- Description: Failed Insulator
- Disturbance Report Filed: No

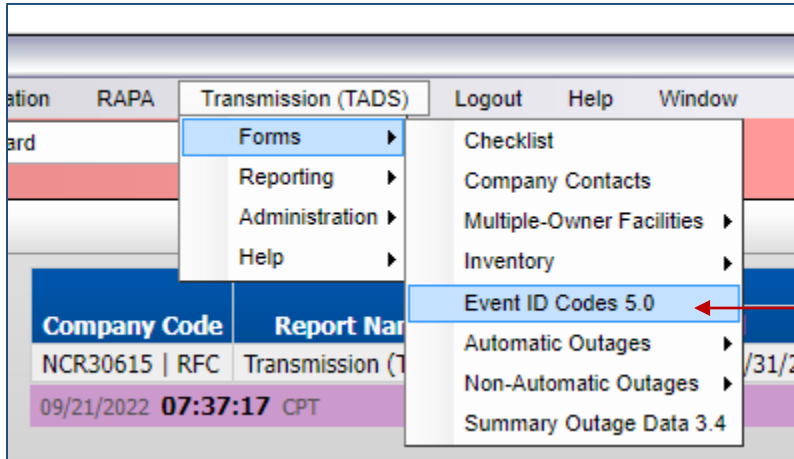
GUI Line Outage Entry

- Outage ID Code: Outage 9
- Event ID Code: Event 9
- TO Unique Element Identifier: 1120
- Outage Initiation Code: Element-Initiated
- Fault Type: P-P fault
- Time Zone: EST
- Start Time: 10/1/2023 15:30
- Outage Duration: 0005:00
- Initiating Cause: Failed AC Circuit Equipment
- Sustained Cause: Failed AC Circuit Equipment
- Outage Mode: Single Mode
- Outage Continuation Code: Start/End current period

Bulk Upload Line Outage Entry

- Outage ID Code: Outage 10
- Event ID Code: Event 10
- TO Unique Element Identifier: 1130
- Fault Type: Single P-G
- Outage Initiation Code: Element-Initiated
- Start Time: 10/5/2023 15:00
- Time Zone: EST
- Outage Duration: 3:05
- Initiating Cause Code: Lightning
- Sustained Cause Code: Failed AC Circuit Equipment
- Outage Mode: Single Mode
- Outage Continuation Code: 0

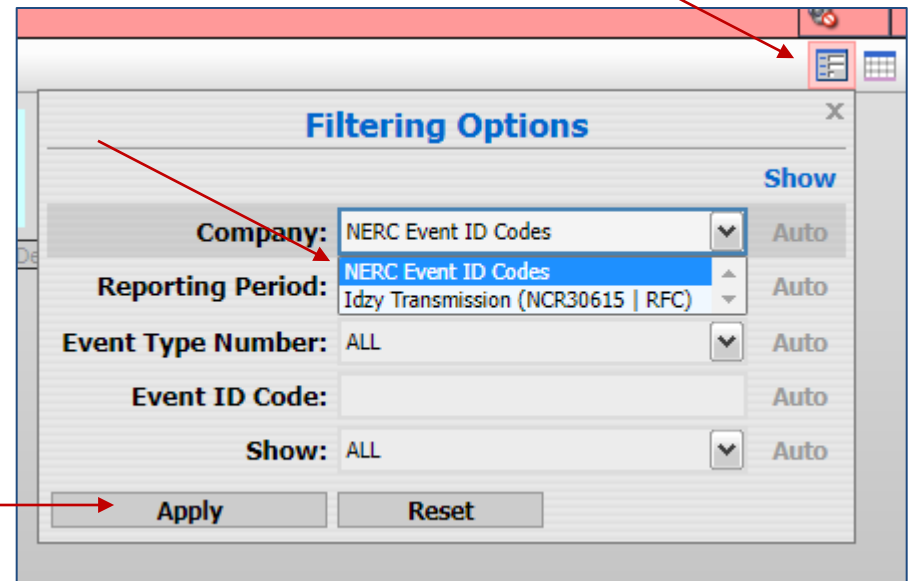
Creating an NMU Event ID



Navigate to the 'Event ID Codes 5.0' form

Click on the filtering box in the top right corner.

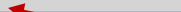
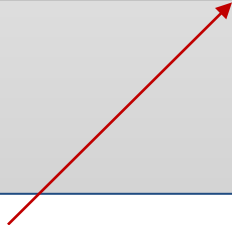
Select 'NERC Event ID Codes' from the Company drop down box. Click Apply.



Creating an NMU Event ID

Event ID Codes (5.0) Company: **NERC Event ID Codes** Reporting Period: **2022**

No records have been found



Ensure the Company is 'NERC Event ID Codes' and you are in the correct reporting period for the event.

Click 'Add Event ID Code'

Complete Form 5.0 as you normally would and click Enter.

Communicate Event ID number to related Entities

Company Name: North American Electric Reliability Corporation (NERC)
Reporting Period: 2022 (01/01/2022 - 12/31/2022)
Event ID Code: NERC Event ID Code
Event Type Number: 62 Security (unintended operation).
Description:
Disturbance Report Filed: Please select one...

Extended Cascading Tolerance: No

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:**

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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Checklist Completion

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- Last step in Quarterly reporting
- Verifies all data has been submitted or none to report
- Indicator for Regional Coordinators that reporting is complete
- Runs data validations for possible errors
 - Errors must be corrected
 - Warnings should be reviewed

Click 'Modify' button to save changes

- Live Demo

A stylized map of North America, including the United States, Canada, and Mexico. The map is rendered in shades of blue and grey, with the United States and Canada in a darker blue and Mexico in a lighter grey. The map is centered on the page and partially overlaid by a horizontal blue band.

Questions and Answers

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In Service State / TADS Reportable

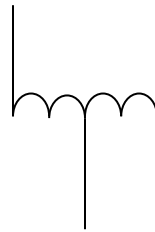
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Do I report my transformer based off of low side or high side?

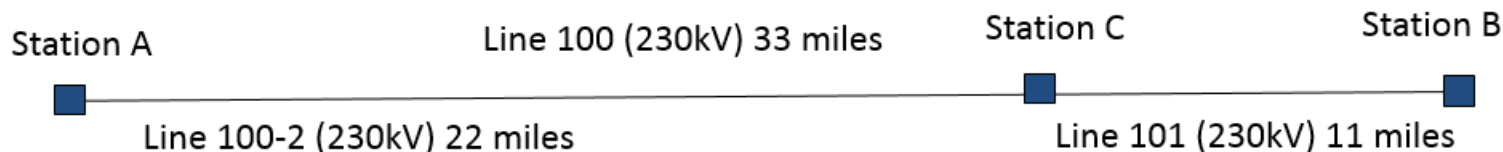
- Transformers are classified as TADS reportable based on their lower or secondary voltage classification. Transformers with secondary or lower winding voltages greater than 100kV, or are included in the BES through the inclusion criteria are reportable.
- Once a transformer has been classified as reportable, 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

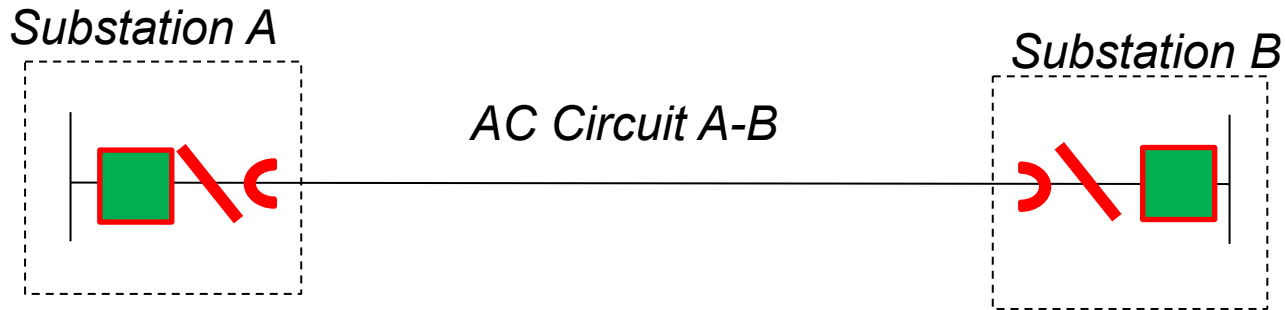
Splitting a Circuit

- 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

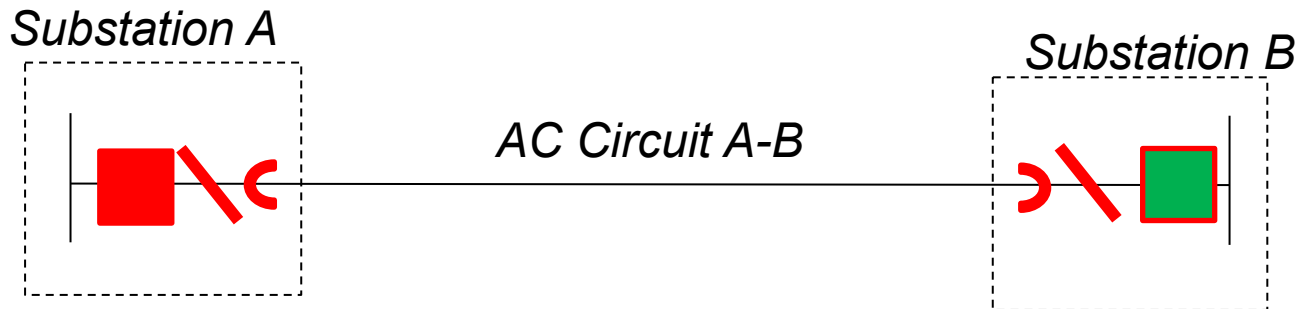
In Service State Definition



- In Service State

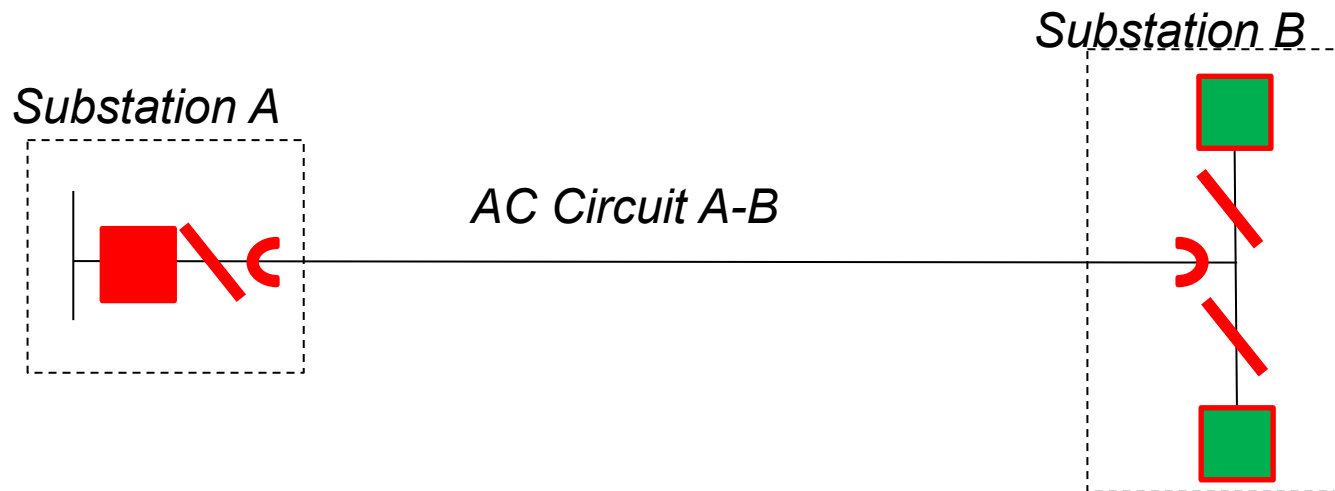
- An Element that is energized and connected at all its terminals to the system.
 - AC Circuit A-B is not in service in this example because it is not energized and it is not connected to terminal A and terminal B

In Service State Definition



- 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

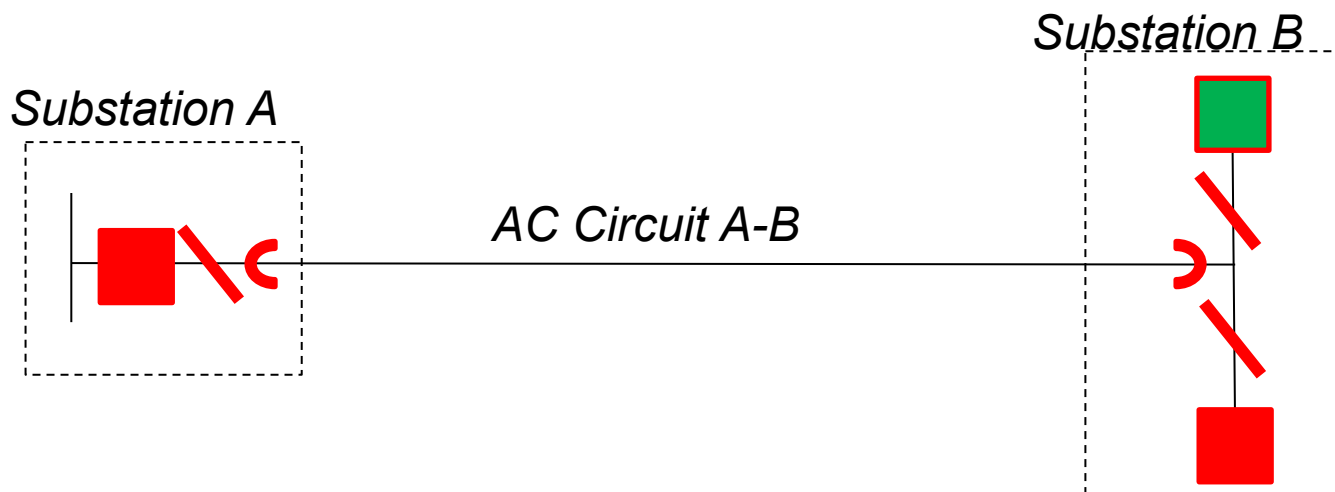
In Service State Definition



- 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

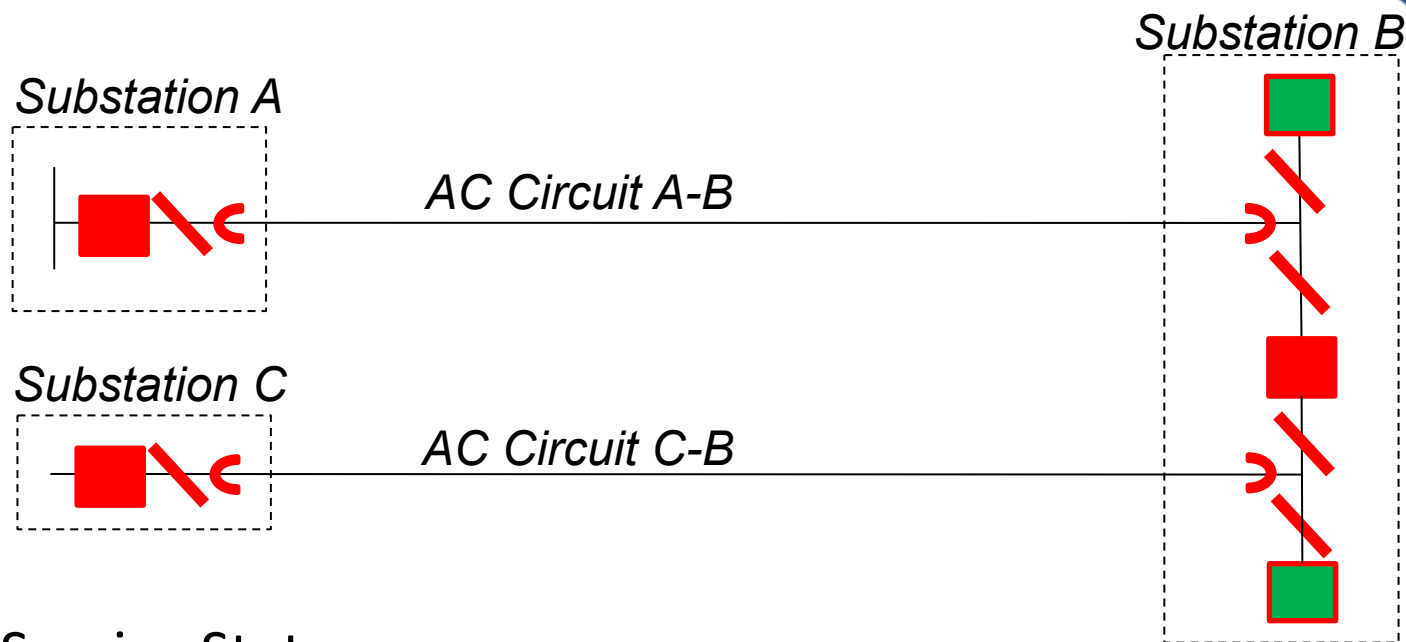
In Service State Definition



- 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

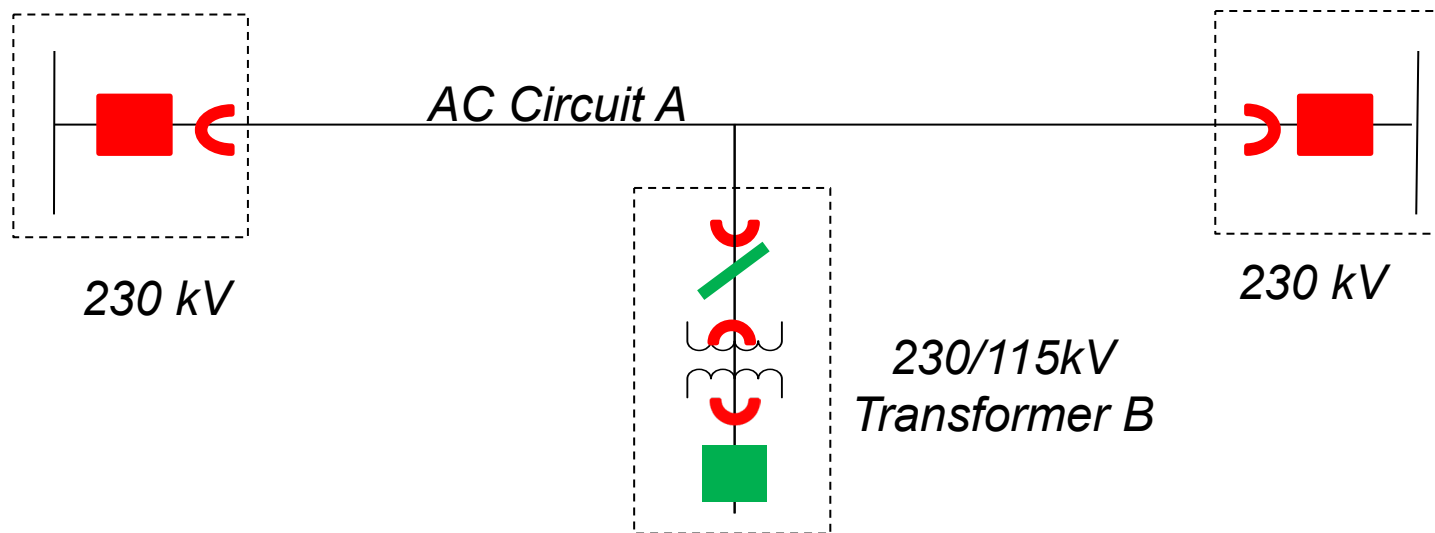
In Service State Definition



- In Service State

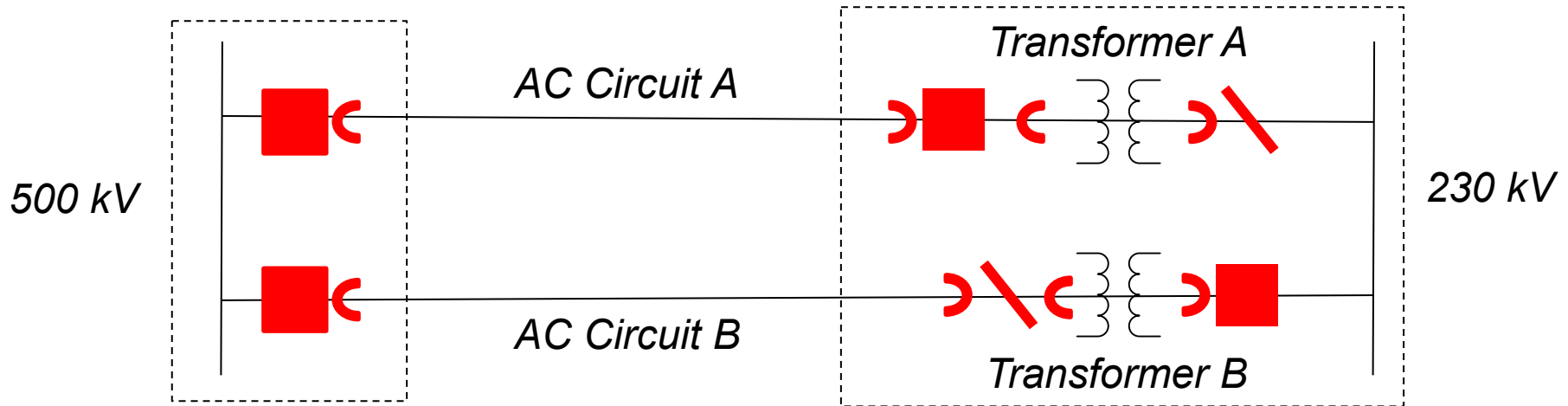
- An Element that is energized and connected at all its terminals to the system.
 - AC Circuit A-B is in service in this example because it is energized and is connected at terminal A and terminal B

In-Service State Example



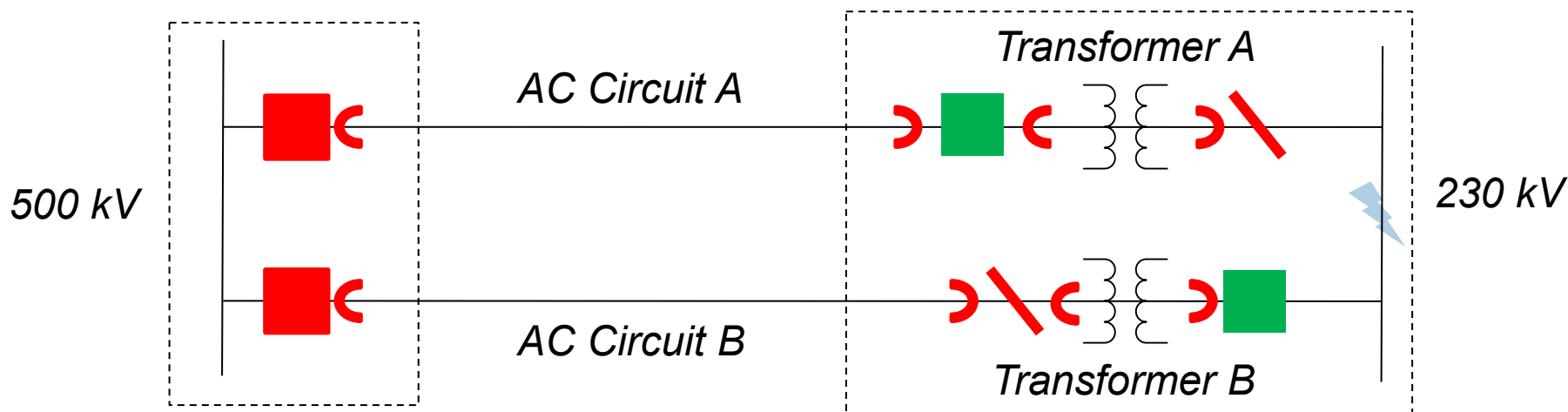
- Transformer B experiences a fault. The fault is interrupted by the breakers on AC circuit A and Transformer B. After the disconnect switch is opened AC Circuit A is automatically restored within a minute.
 - AC Circuit A reports a momentary outage
 - AC Circuit A returns to an in service state per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

In-Service State Example



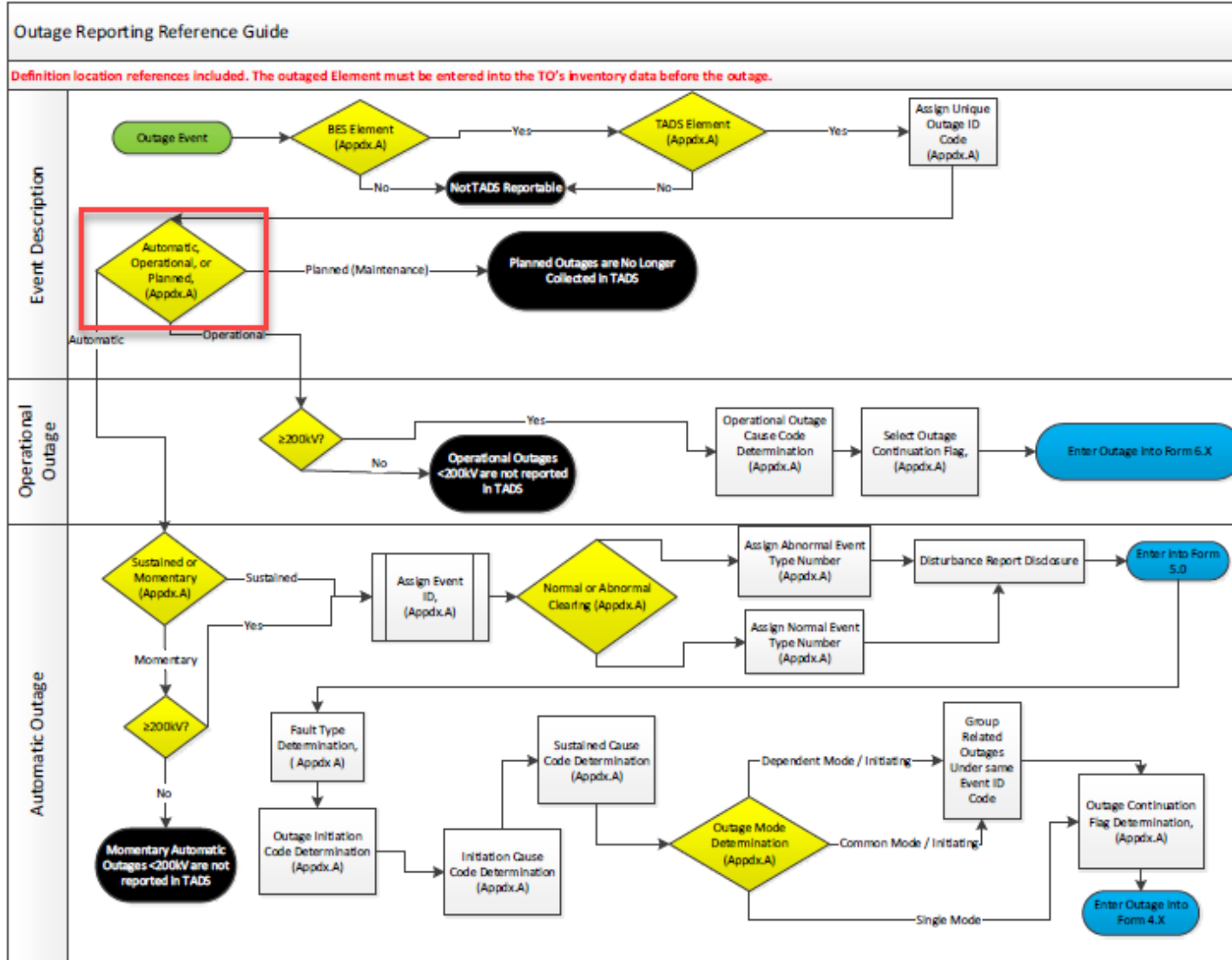
- AC Circuit A is bound by the two breakers
 - Transformer A is bound by a breaker and a disconnect switch
 - AC Circuit B is bound by a breaker and a disconnect switch
 - Transformer B is bound by a breaker and a disconnect switch

In-Service State Example



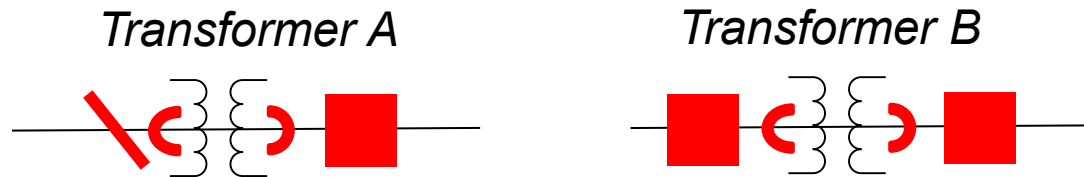
- A 230 kV bus fault opens the designated breakers.
 - AC Circuit A reports an outage – one terminal is disconnected
 - Transformer A reports an outage – both terminals are disconnected
 - AC Circuit B DOES NOT report an outage – both terminals are connected
 - Transformer B reports an outage – one terminal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

Determination: Is it an automatic outage?



- **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.

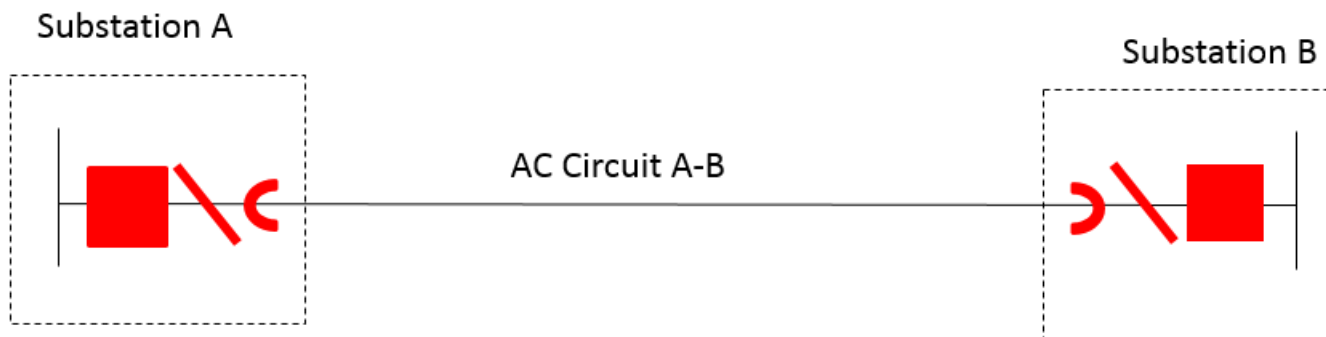
AC Transformer Definition



- AC Transformer

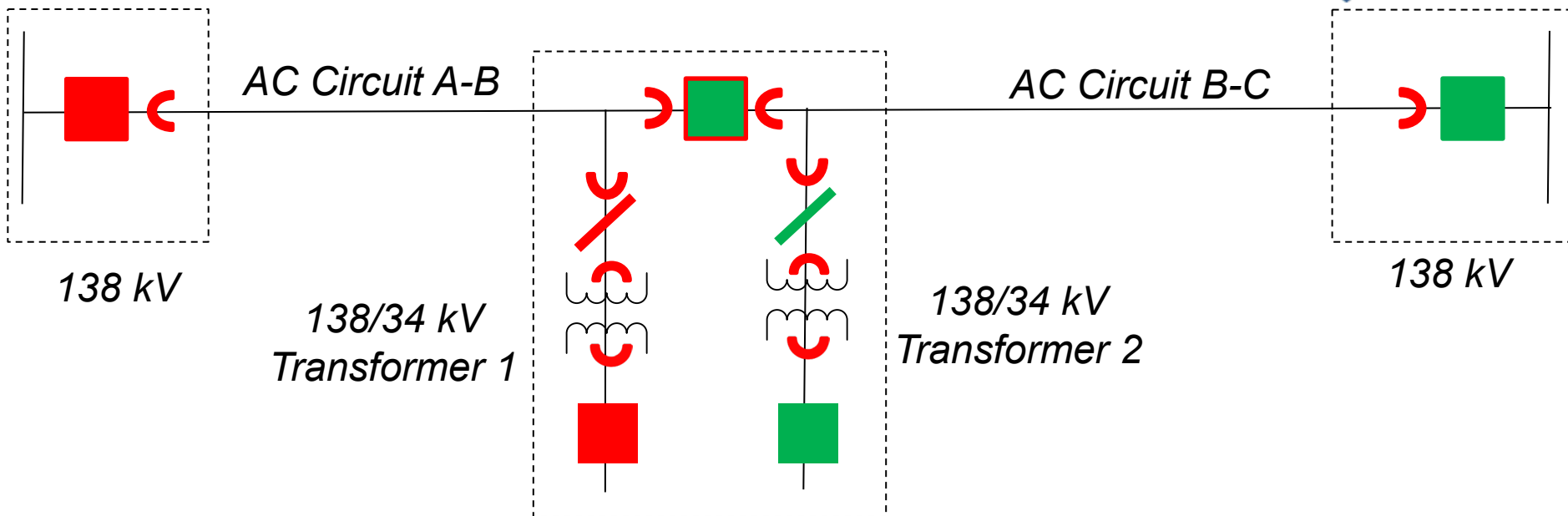
- A bank comprised of three single-phase transformers or a single three-phase transformer. A Transformer is bound by its associated switching or interrupting devices.
- Transformer A is bound by the breaker and disconnect switch.
- Transformer A is Not in Service if either the breaker or disconnect switch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



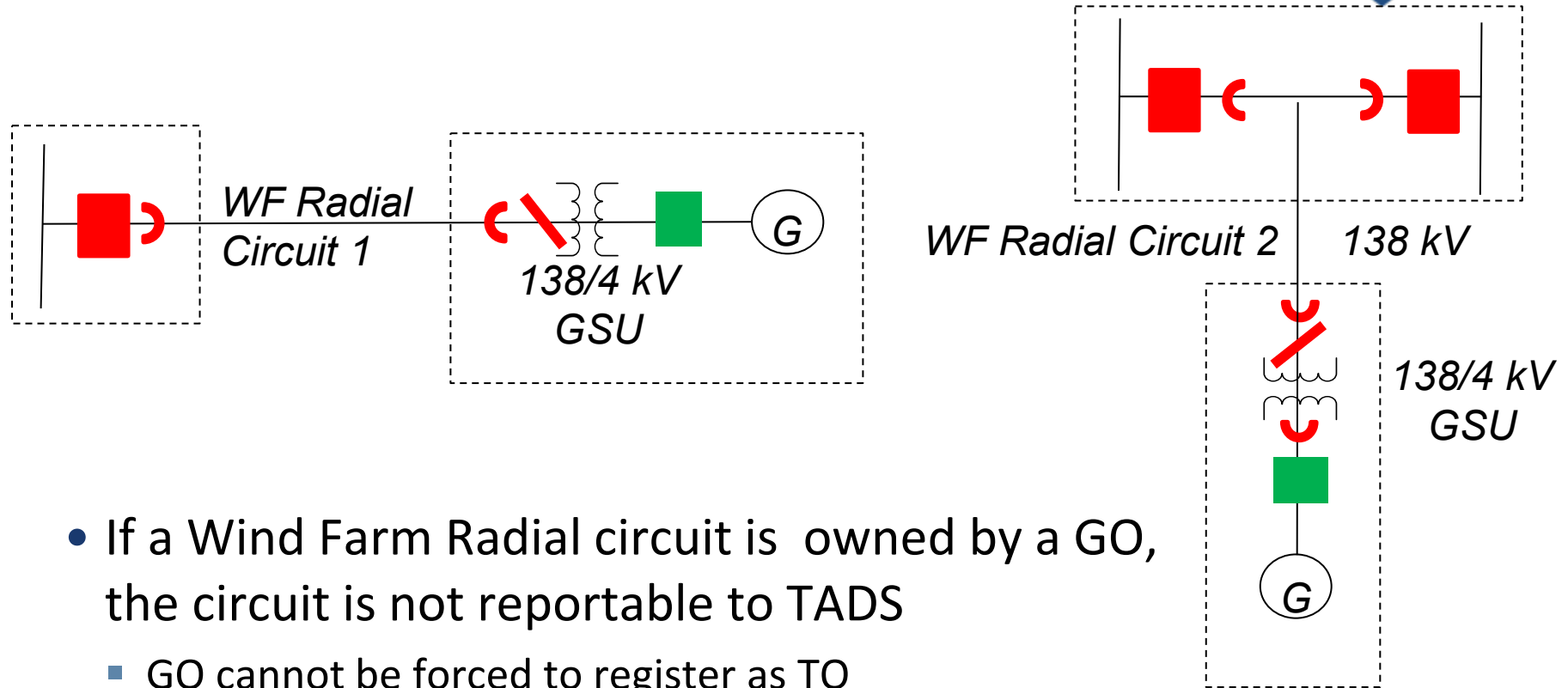
- AC Circuit

- 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.



- 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

Radial connection to Wind Farm



- 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

Momentary or Sustained

- **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.

SLIDO QR Code



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 vs Sustained

- **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.

Momentary vs Sustained

- **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

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 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

Automatic Outage Data

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.
<p>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.</p>	
D	The Fault Type (if any) for each circuit Outage, input from a drop-down menu.

Automatic Outage Data

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.

Automatic Outage Data

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	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. 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.

Operational Outages Form 6.X

Operational Outage

- A Non-Automatic Outage for the purpose of avoiding an emergency (i.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.
---	--

Operational Outage Data

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.

Operational Outage Cause Codes

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

Operational Outage Cause Codes

- **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, with the United States and Canada in a darker blue and Mexico in a lighter grey. The map is centered on the page and partially overlaid by a horizontal blue band.

Questions and Answers

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Outage Initiation Codes

October 2023

RELIABILITY | RESILIENCE | SECURITY



- 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**.

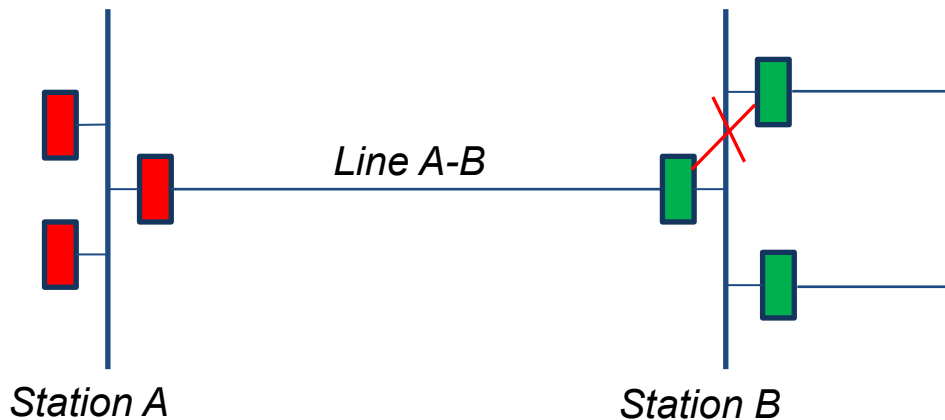
- **Example 4**

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

Example 1

Bus Fault

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

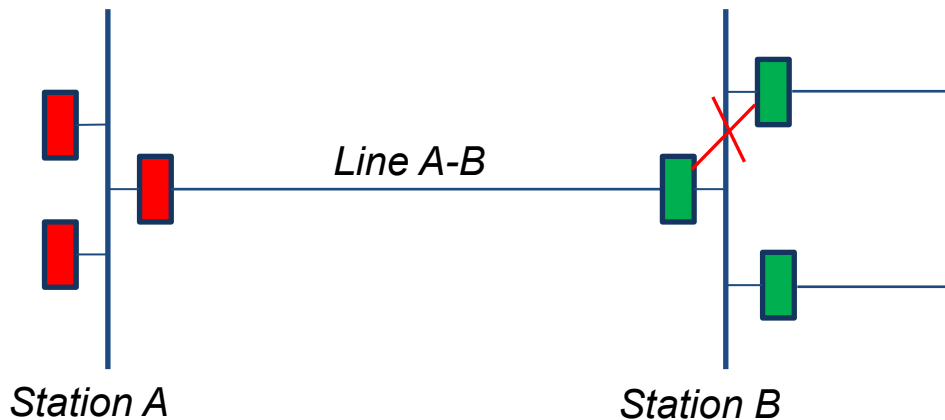


- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

Example 1

Bus Fault

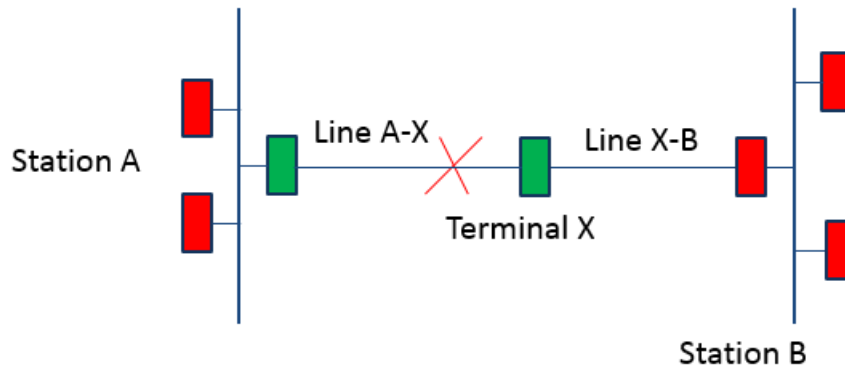
- A fault occurs on the bus at Station B.
- What is the Outage Initiation Code for Line A-B?



- 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**?

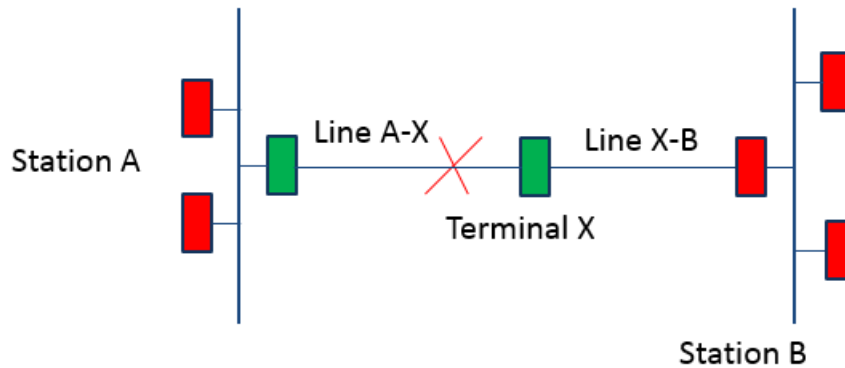


- A. Element-Initiated
- B. Other Element-Initiated
- C. AC Substation-Initiated
- D. Protection System Initiated
- E. Other Facility Initiated
- F. None of the above

Example 2

A fault on AC Circuit 'A-X'

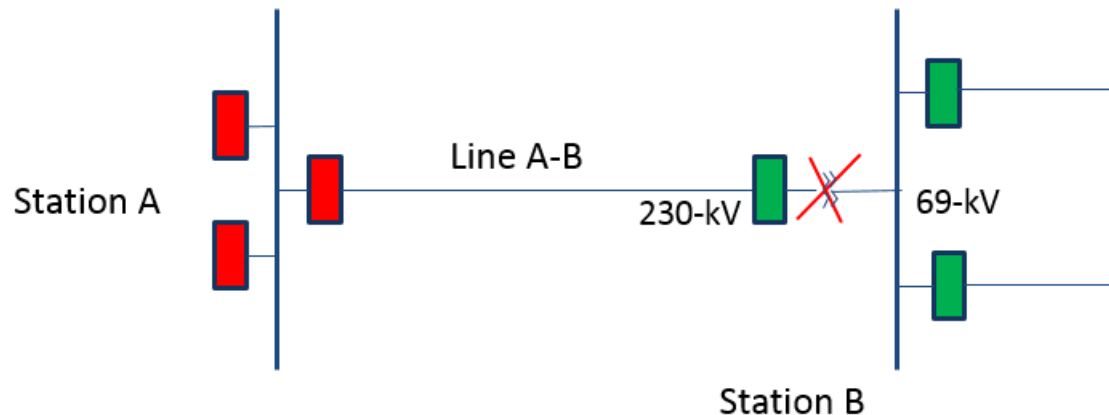
- What is the Outage Initiation Code for **Line X-B**?



- 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

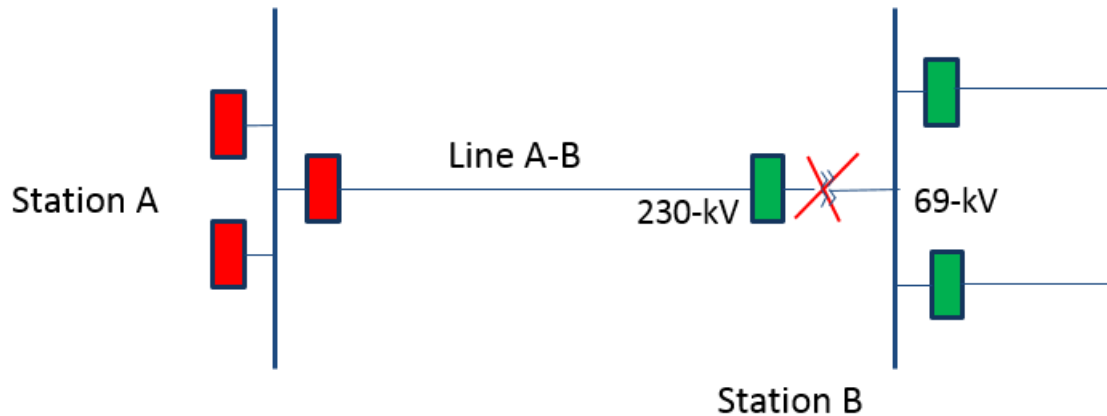
- A fault inside the non-element 230/69-kV Transformer at Station B.
- What is the Outage Initiation Code for 230-kV Line A-B?



- 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

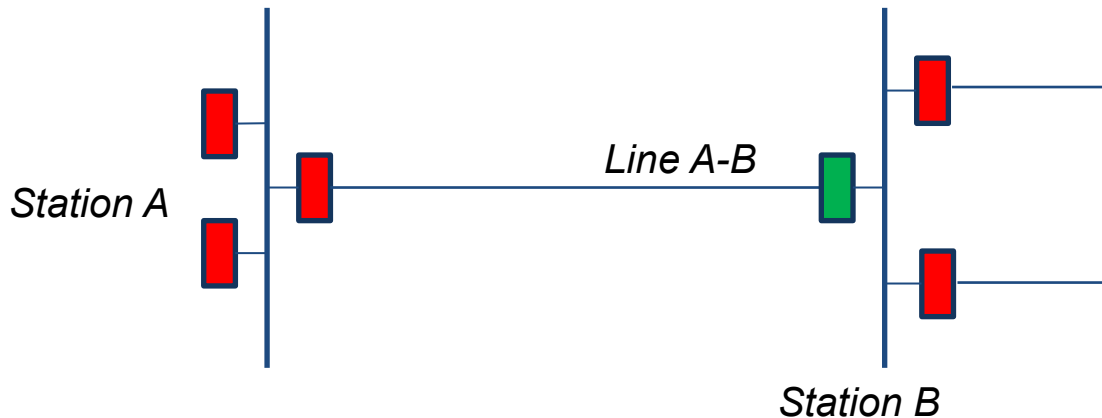
- A fault inside the non-element 230/69-kV Transformer at Station B.
- What is the Outage Initiation Code for 230-kV Line A-B?



- 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

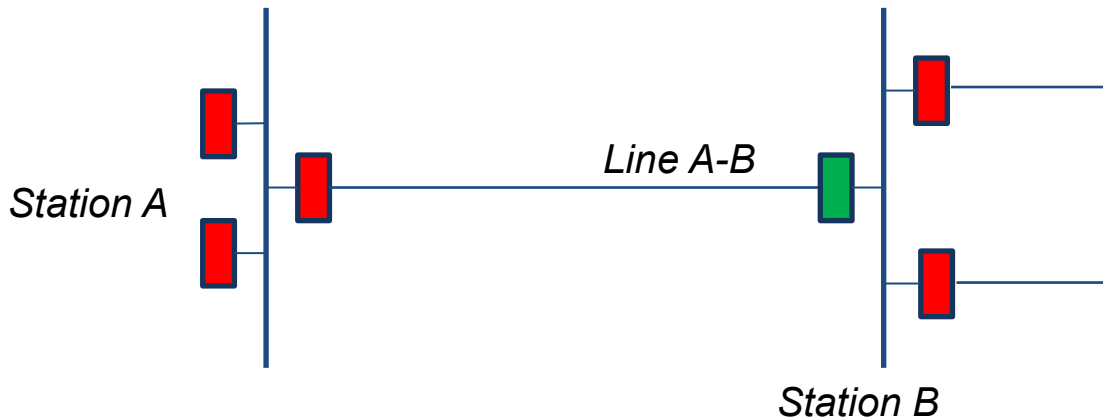
- An employee turns the wrong handle and accidentally opens the breaker at Station B on Line A-B.
- What is the Outage Initiation Code for Line A-B



- 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

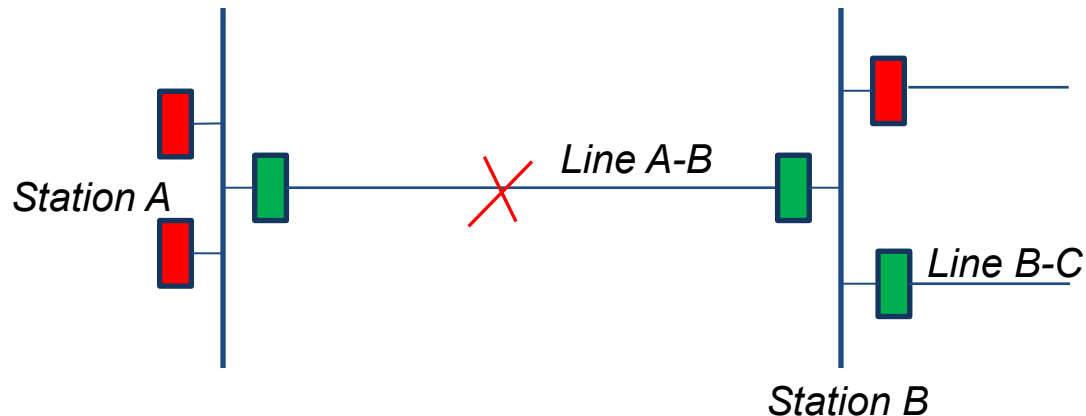
- An employee turns the wrong handle and accidentally opens the breaker at Station B on Line A-B.
- What is the Outage Initiation Code for Line A-B



- 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

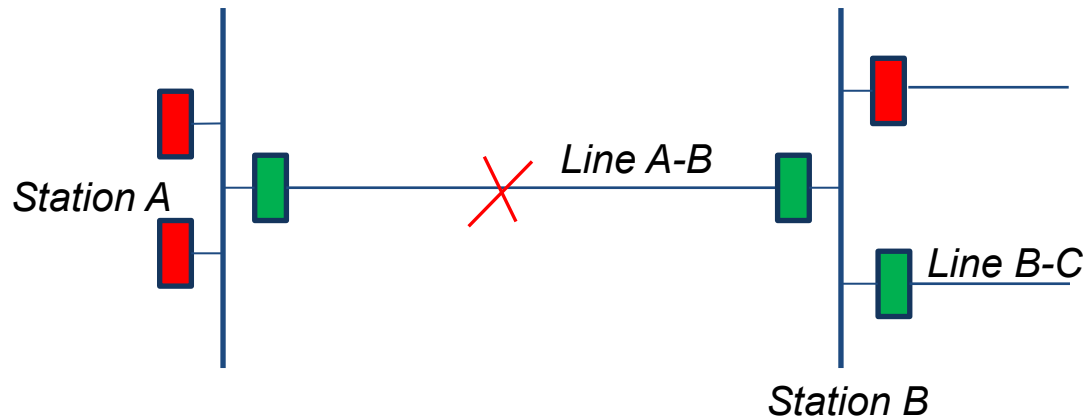
- The breaker on Line B-C erroneously opens due to relays having the wrong settings.
- What is the Outage Initiation Code for Line B-C?



- 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

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

October 2023

RELIABILITY | RESILIENCE | SECURITY



Initiating Cause Codes (ICC)

Initiating and Sustained Cause Codes

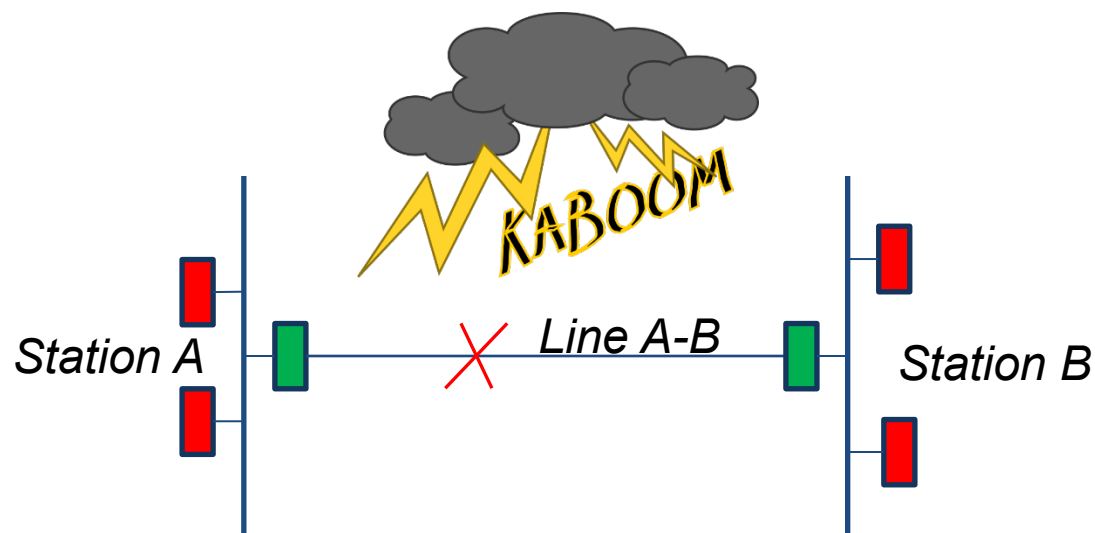
- The Initiating Cause Code describes the initiating cause of the outage.
- The Sustained Cause Code describes the cause that describes the sustained cause of the outage which contributed to the longest duration.
 - How to interpret “contributed to the longest duration”:
 - Suppose that lightning caused 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.

Which Cause Code to Pick

- 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
- **Cyber Security Incident (2024)**
- 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

Example 1

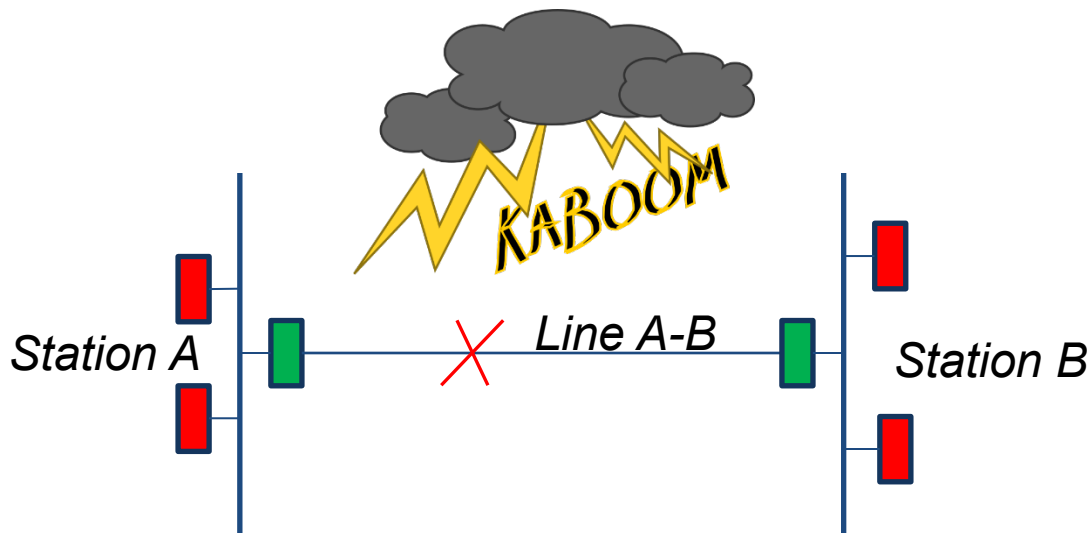
A lightning strike on an AC Circuit.
What is the Initiating Cause Code?



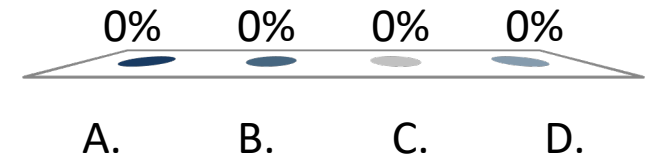
- A. Lightning
- B. Failed AC Circuit equipment
- C. Weather, excl. lightning
- D. Foreign Interference

Example 1

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

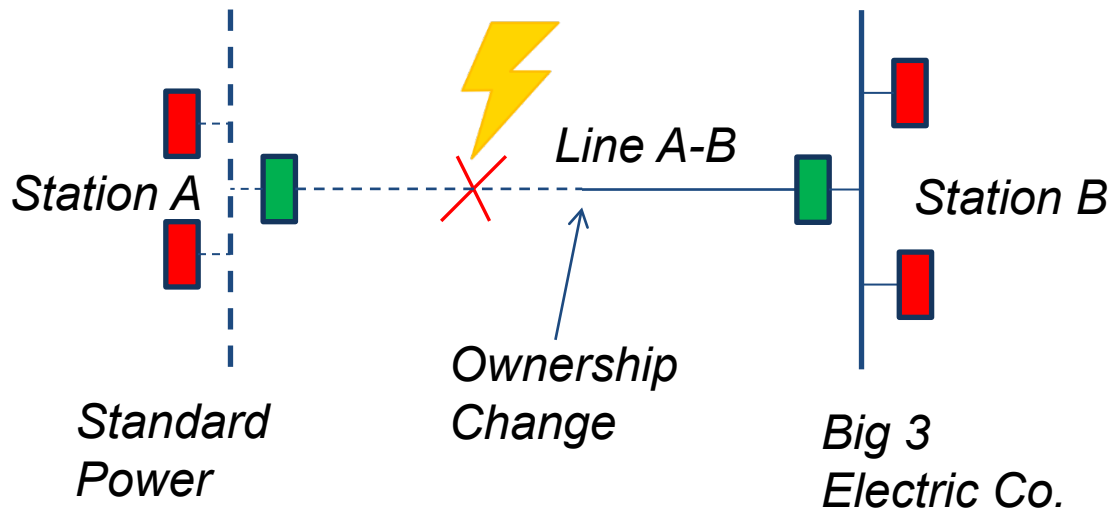


Example 2: Ownership Change

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

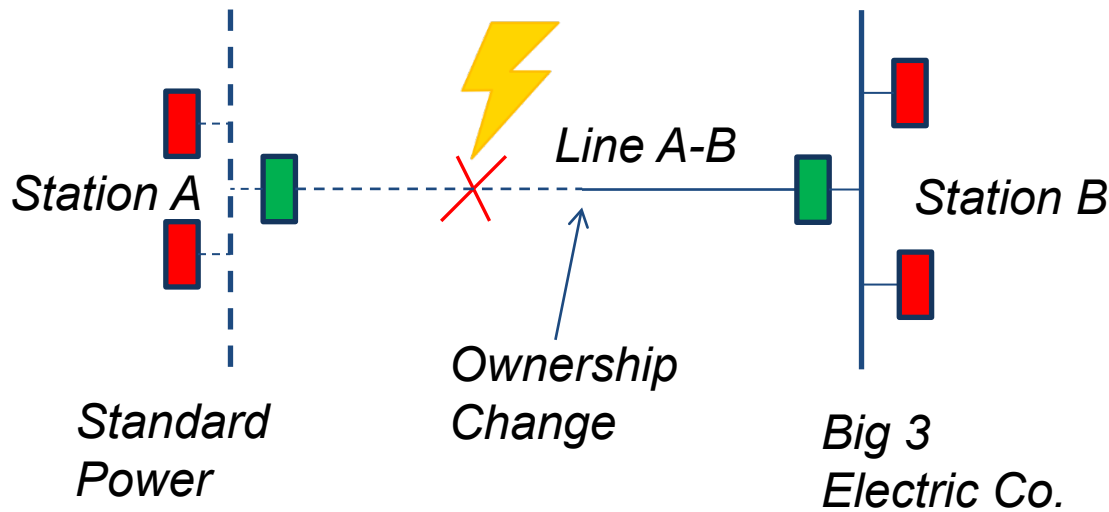


Example 2: Ownership Change

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?

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



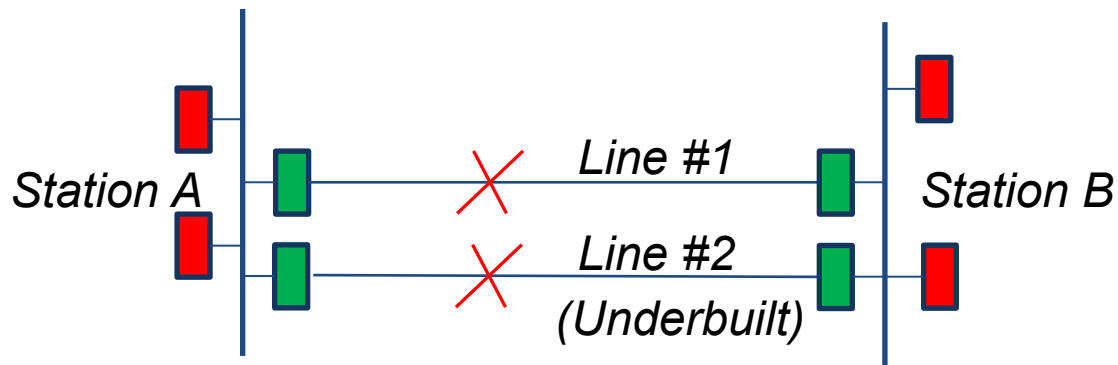
Example 3: Underbuilt

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 3: Underbuilt

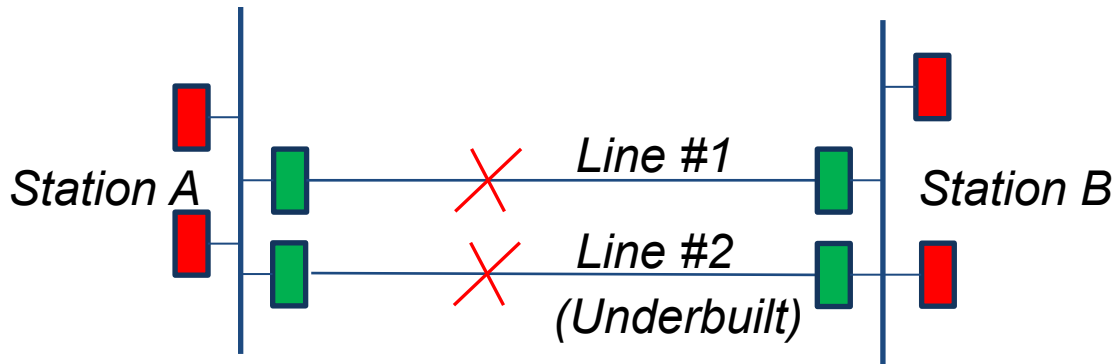
A sleeve failure occurs on Line #1 and the conductor breaks and falls into underbuilt Line #2.

(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



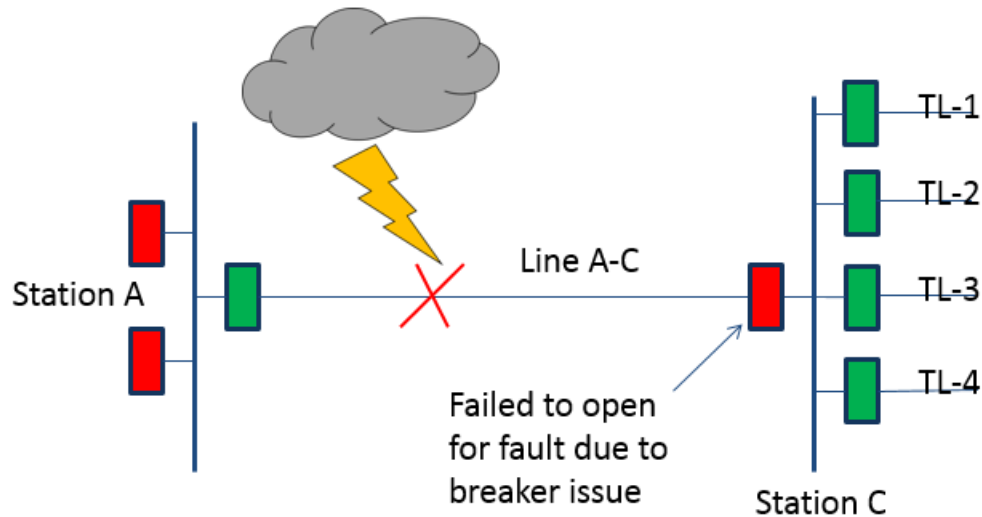
Example 4: Breaker fails to clear fault

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



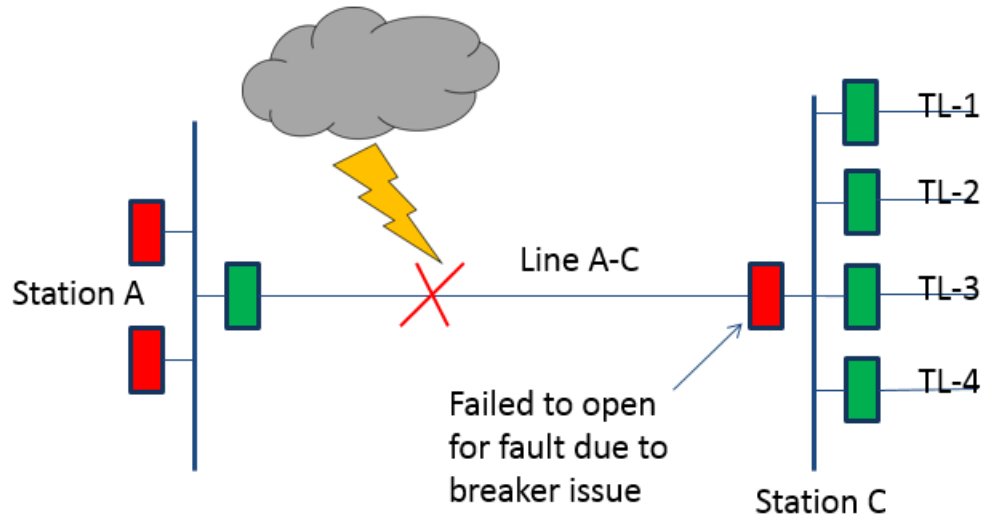
Example 4: Breaker fails to clear fault

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**?

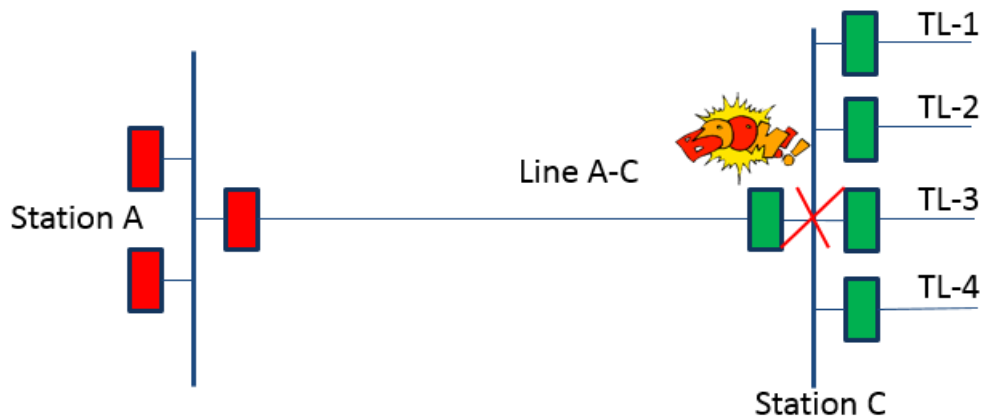
- A. Other
- B. Lightning
- C. Weather, excl. lightning
- D. Failed Substation Equipment**



Example 5: Potential Transformer

A Potential Transformer catastrophically fails causing bus fault.

What is the Initiating Cause Code for all lines?

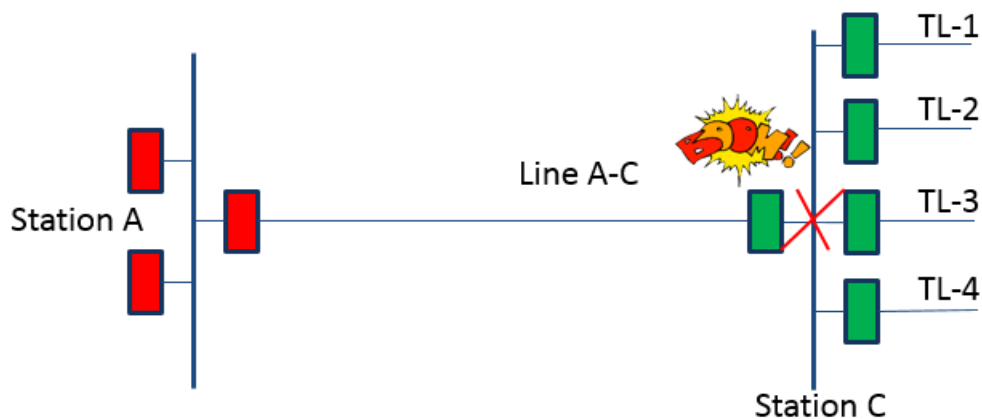


- A. Failed AC Circuit Equipment
- B. Failed Protection System Equipment
- C. Failed AC Substation Equipment
- D. Power System Condition

Example 5: Potential Transformer

A Potential Transformer catastrophically fails causing bus fault.

What is the Initiating Cause Code for all lines?



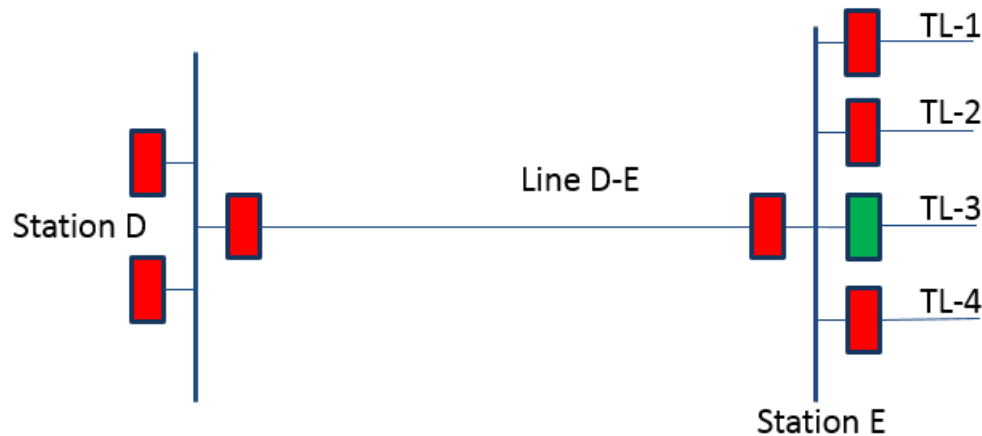
- A. Failed AC Circuit Equipment
- B. Failed Protection System Equipment
- C. Failed AC Substation Equipment
- D. Power System Condition

Example 6: Potential Transformer

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

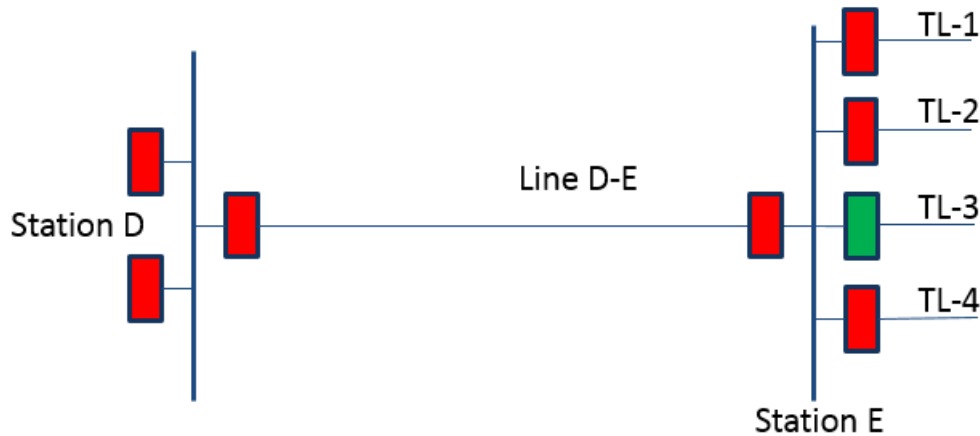


Example 6: Potential Transformer

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



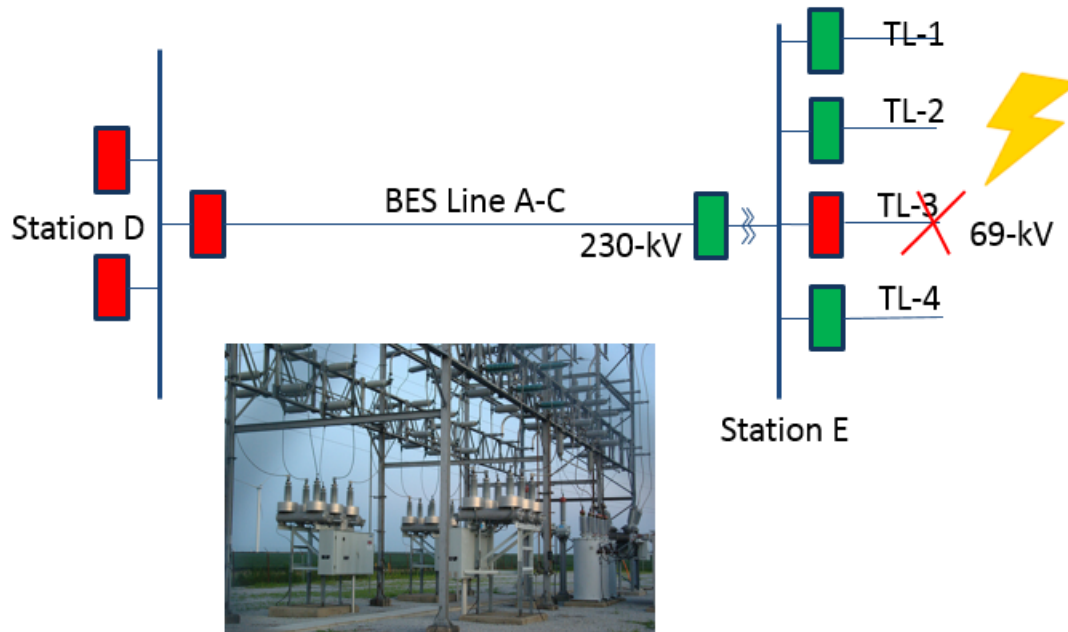
Example 7: Non-BES Faults

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



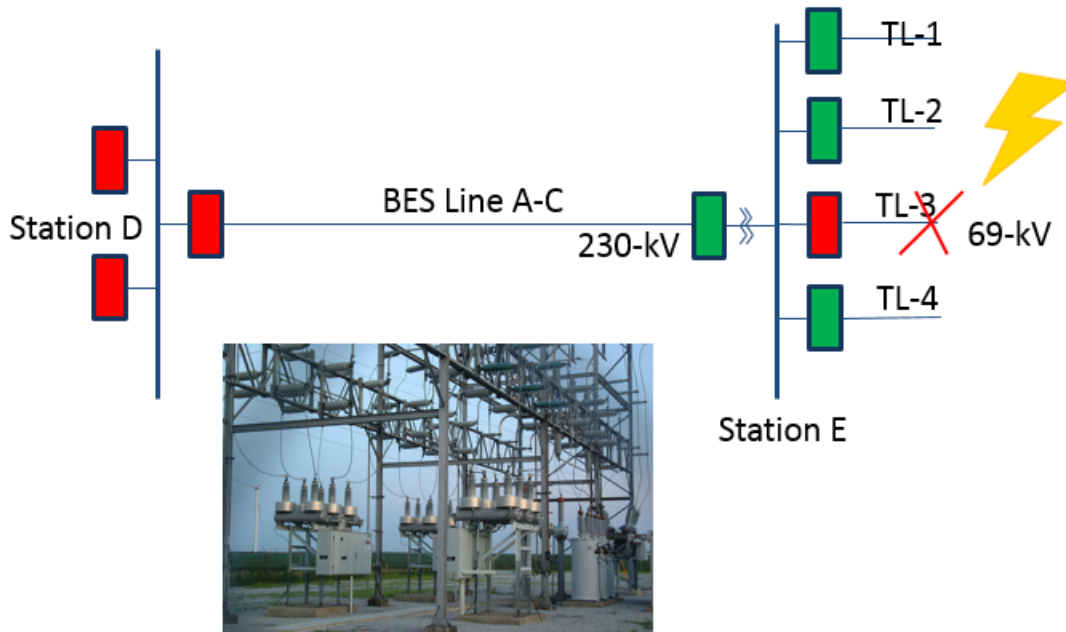
Example 7: Non-BES Faults

Breaker fails to clear lightning fault on 69-kV system

Again, consider why the breaker for the Element opened.

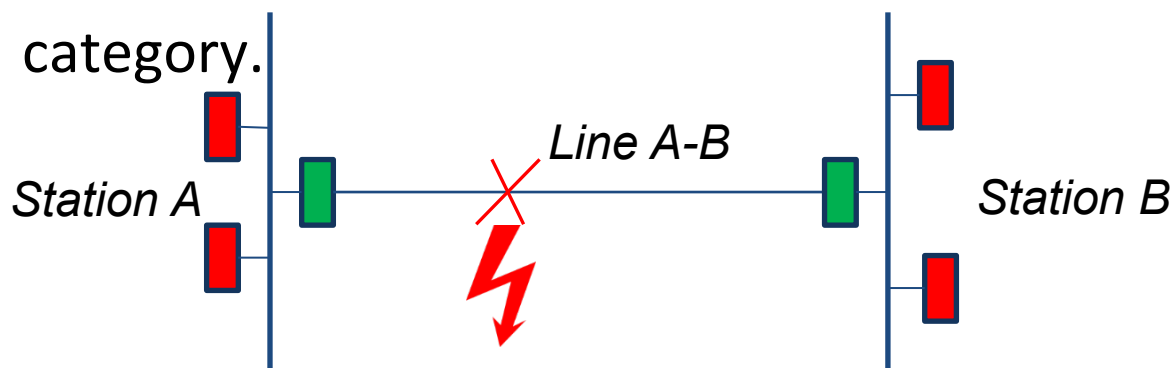
*What is the Initiating Cause Code for **Line A-C**?*

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



Human Error: Automatic Outage Interruptions with Faults Examples

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.



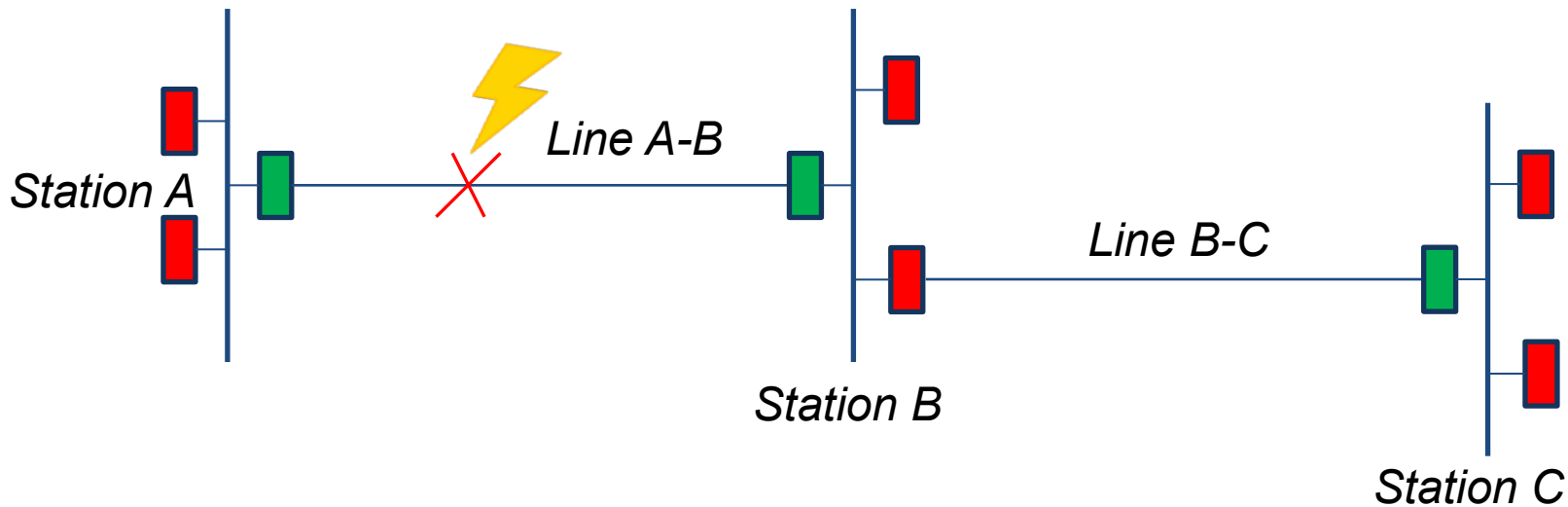
Human Error Automatic Outage Examples (Form 4.X)

- 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

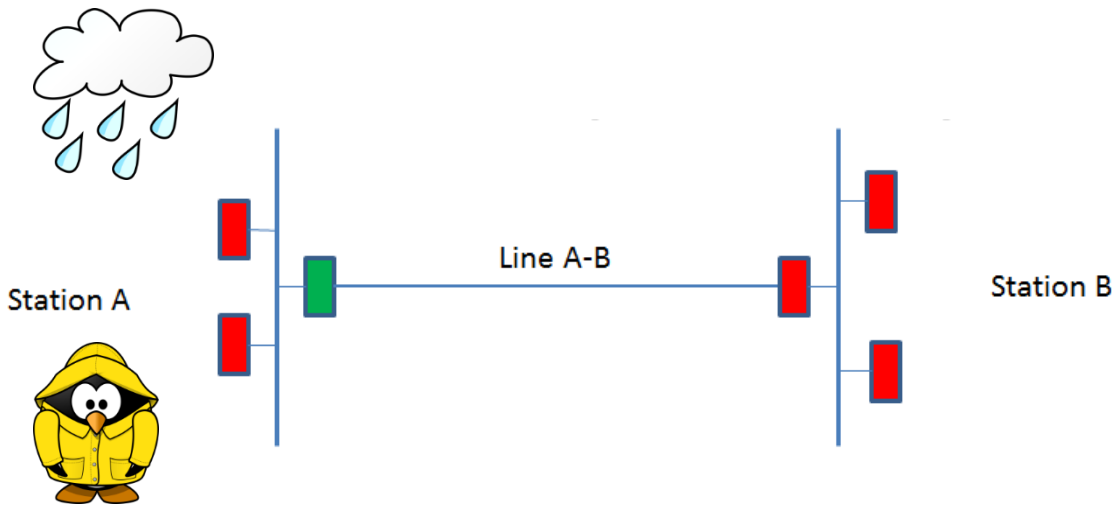


Example 7: Human Error: Automatic Outage Protection System; No Fault Examples

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?

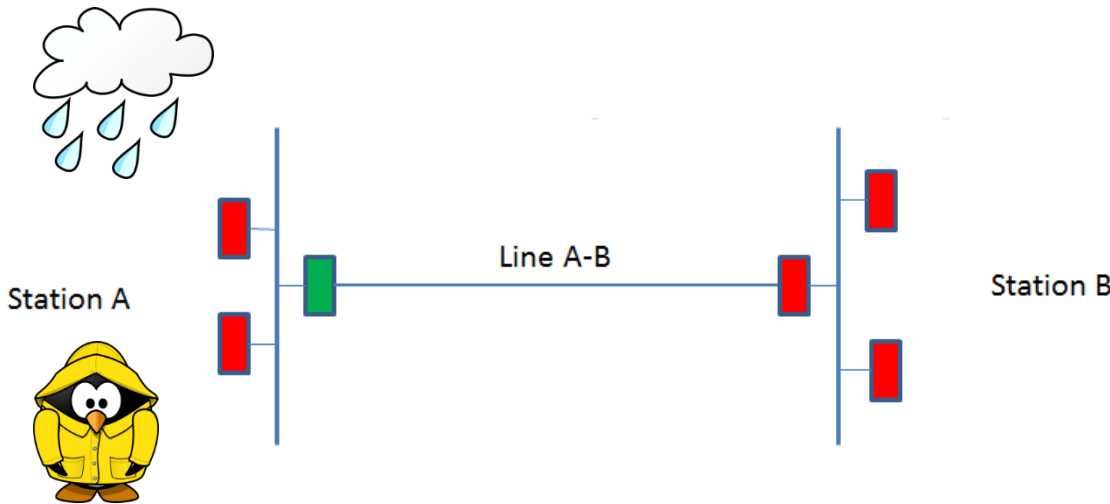


Example 7: Human Error: Automatic Outage Protection System; No Fault Examples

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)

Sustained Cause Code

- 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.

Sustained Cause Code

- 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?”

Sustained Cause Code

- 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?”

Sustained Cause Code

- 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.

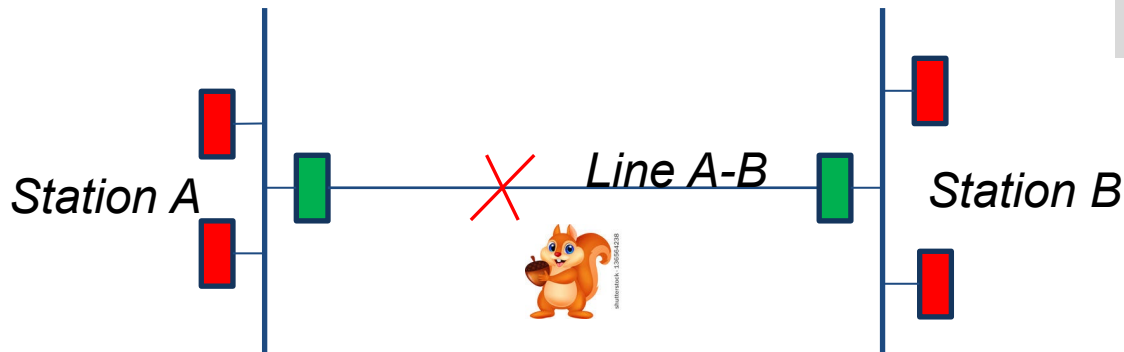
Sustained Cause Code

- 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.

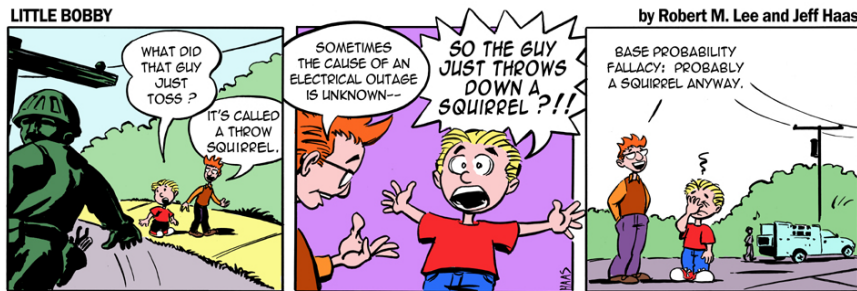
Example 1: Reclosing Example

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

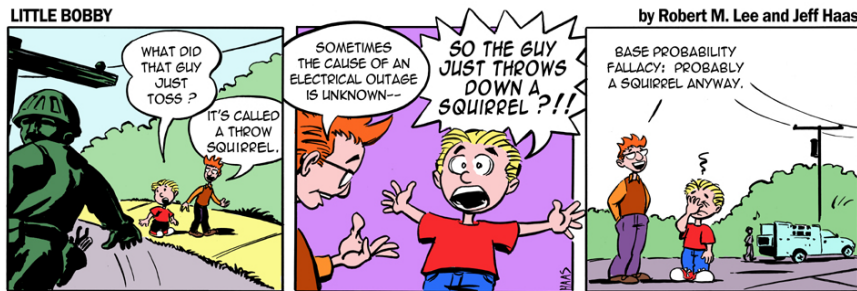
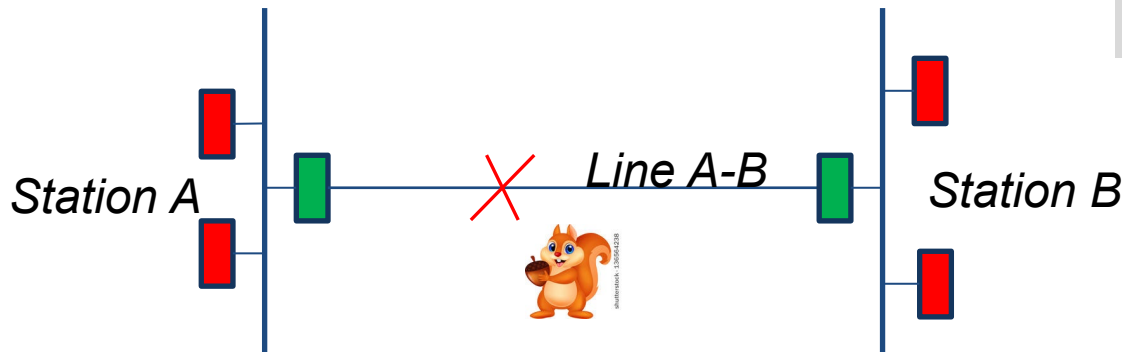


Example 1: Reclosing Example

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

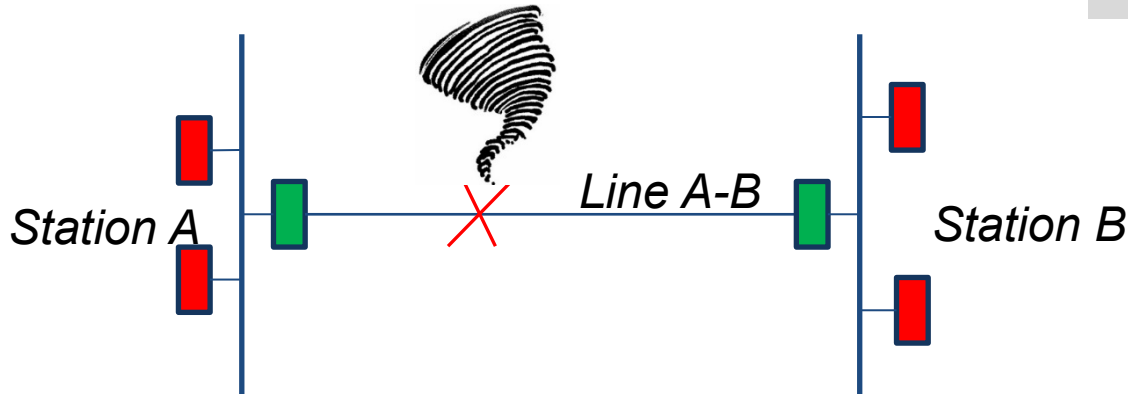
What is the **Sustained Cause Code**?



Example 2: "Weather-Weather"? Example

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**?

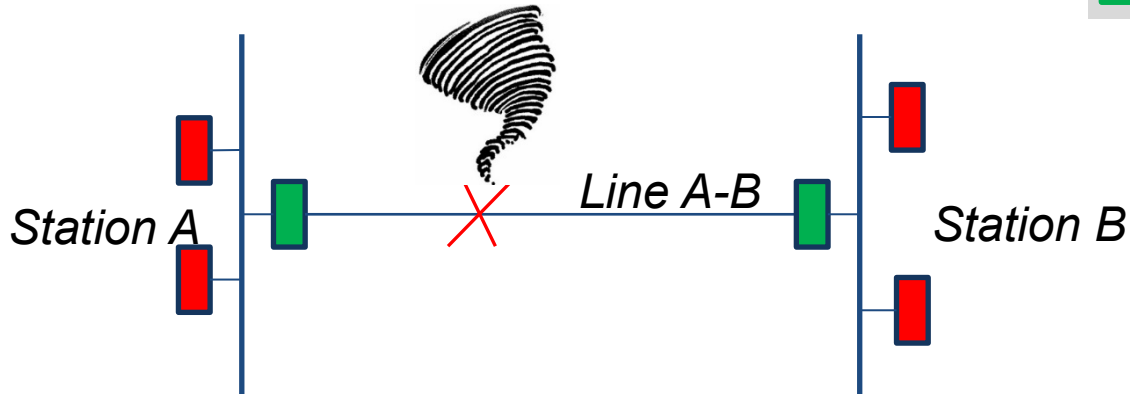


- A. Lightning
- B. Weather, excl. lightning
- C. Other
- D. Failed AC Circuit Equipment

Example 2: "Weather-Weather"? Example

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.

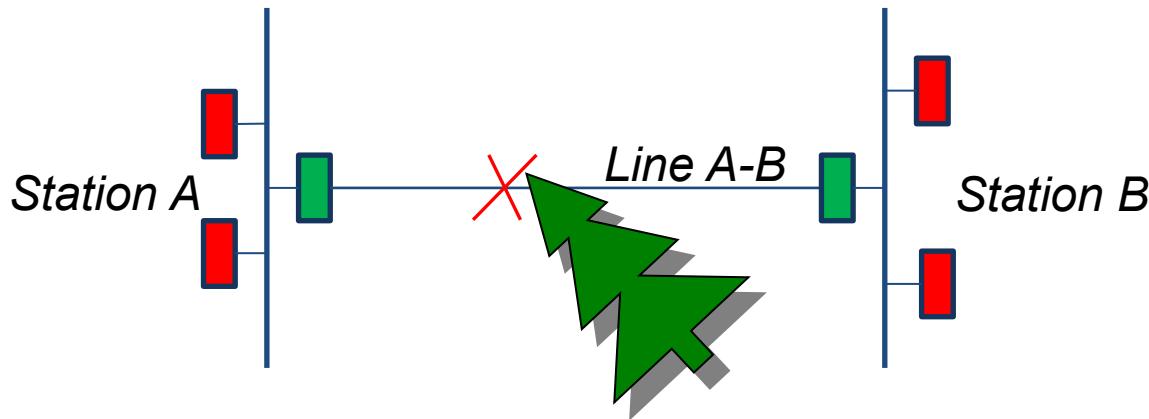
Result from natural disasters examples include:	Human or Animal activity examples include:
<ul style="list-style-type: none"> • Earthquakes, Fires, Tornados, Hurricanes, Landslides, Ice storms, Floods, etc. • Wind shear • Fresh Gale (wind force 8 on the Beaufort scale 34-40 knots or 39-46 mph) • Major 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

Example 3: Vegetation Example

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?

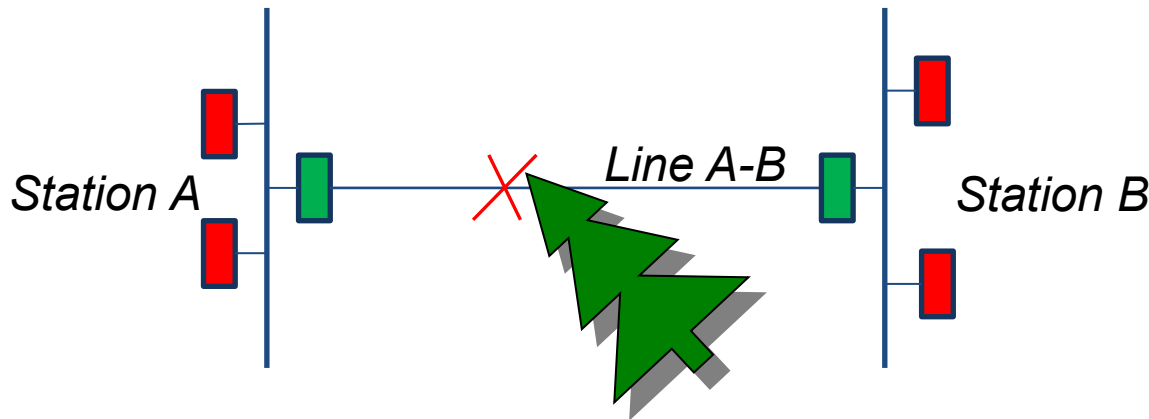


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- A. Unknown
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- D. Foreign interference

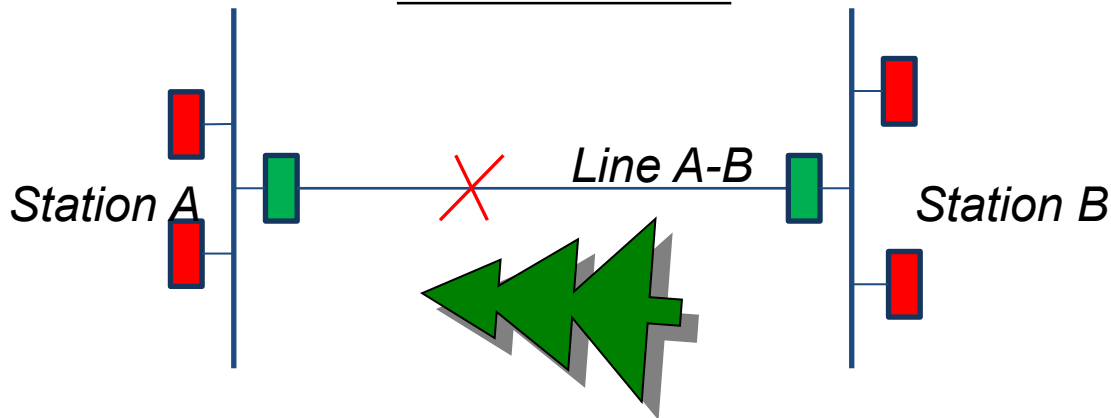
What is the **Sustained Cause** Code?



Example 4: Vegetation Example

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?

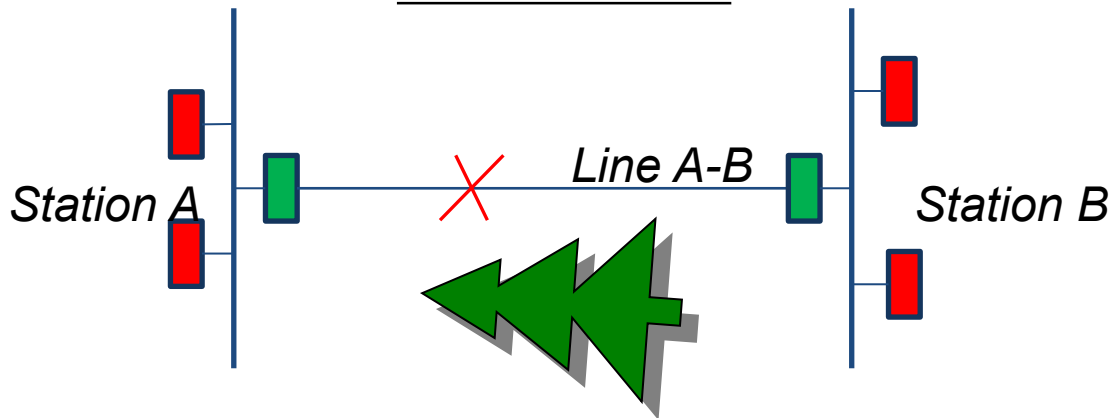


- A. Unknown
- B. Vegetation
- C. Failed AC Circuit Equipment
- D. Foreign interference

Example 4: Vegetation Example

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?



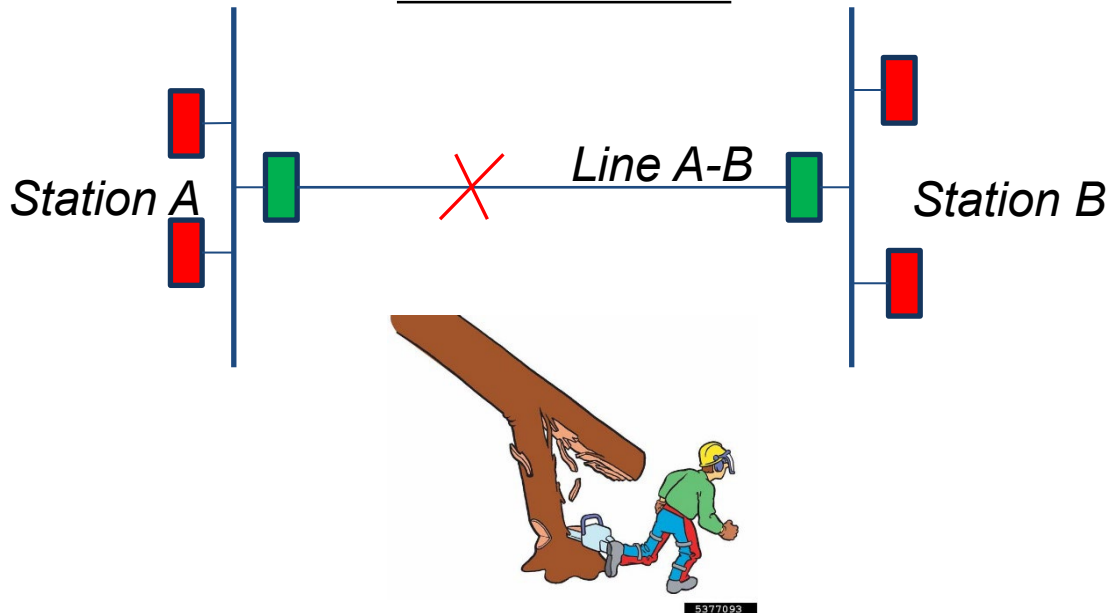
- A. Unknown
- B. Vegetation
- C. Failed AC Circuit Equipment
- D. Foreign interference

Example 5: Vegetation Example

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?

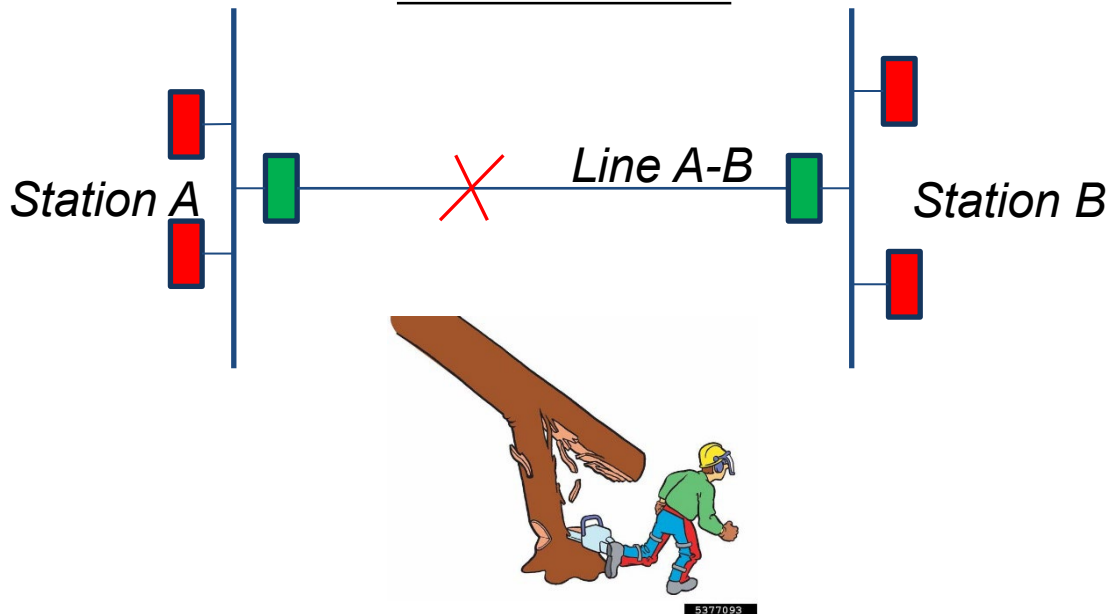


Example 5: Vegetation Example

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?

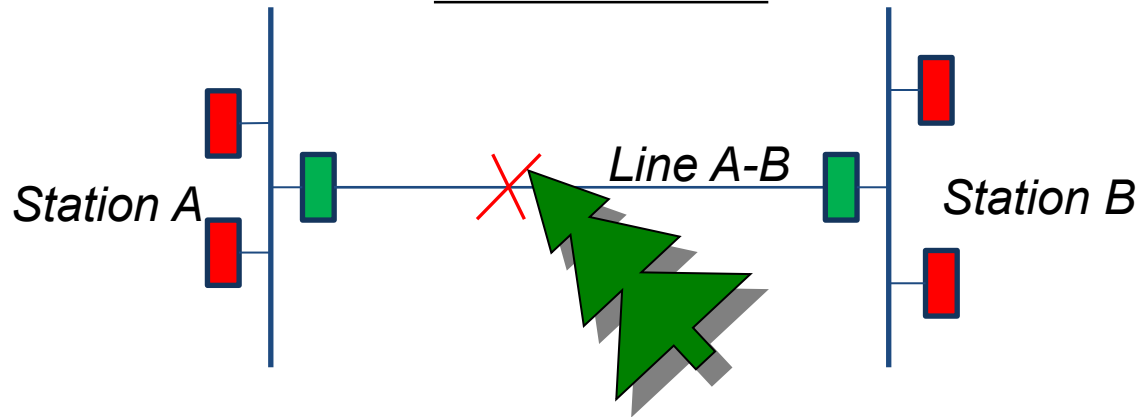


Example 6: Vegetation Example

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?



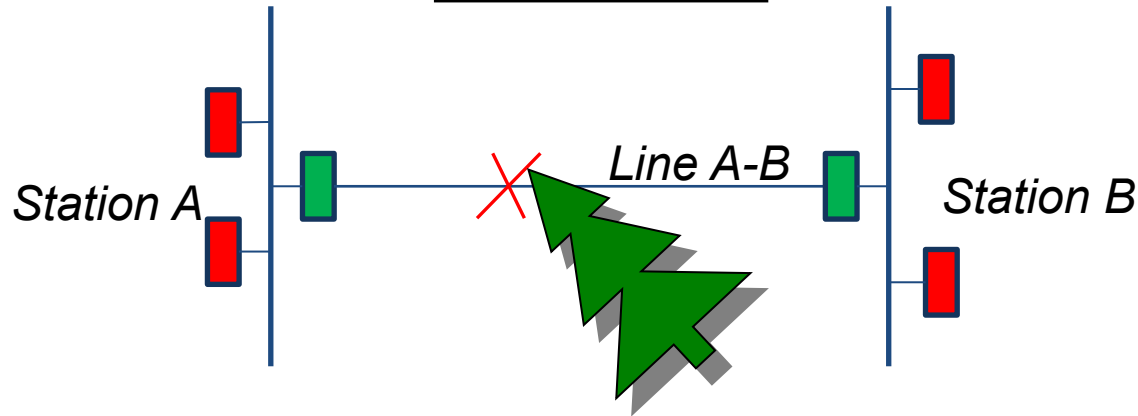
Not vegetation because of exception under vegetation, Nothing broke so not Failed equipment, Not Foreign Interference because of exception.

Example 6: Vegetation Example

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?

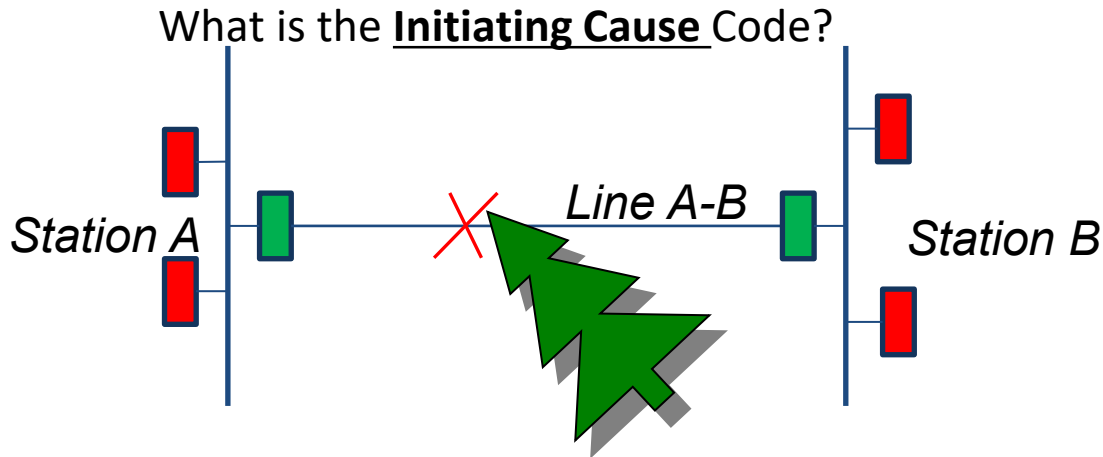


Not vegetation because of exception under vegetation, Nothing broke so not Failed equipment, Not Foreign Interference because of exception.

Example 7: Vegetation Example

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.

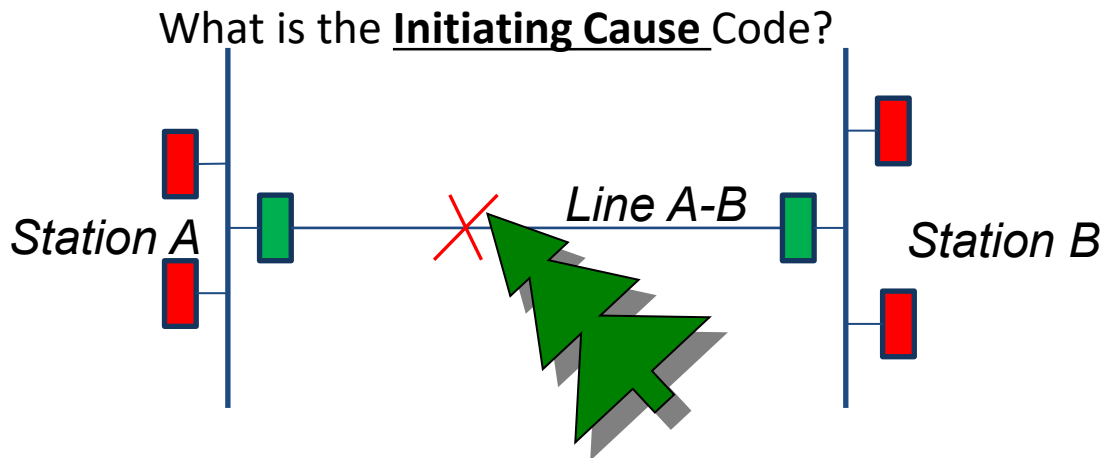
- A. Vegetation
- B. Foreign Interference
- C. Weather, excl. Lightning
- D. Failed AC Circuit Equipment



Example 7: Vegetation Example

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



SLIDO QR Code



A stylized map of North America, including the United States, Canada, and Mexico. The map is rendered in shades of blue and grey, with the United States and Canada in a darker blue and Mexico in a lighter grey. The map is centered on the page and partially overlaid by a horizontal blue band.

Questions and Answers

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NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Fault Types

October 2023

RELIABILITY | RESILIENCE | SECURITY



- 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, Fault Type

- 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.

Single phase to ground fault (P-G)

- 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.

Phase to Phase fault (P-P)

- 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.

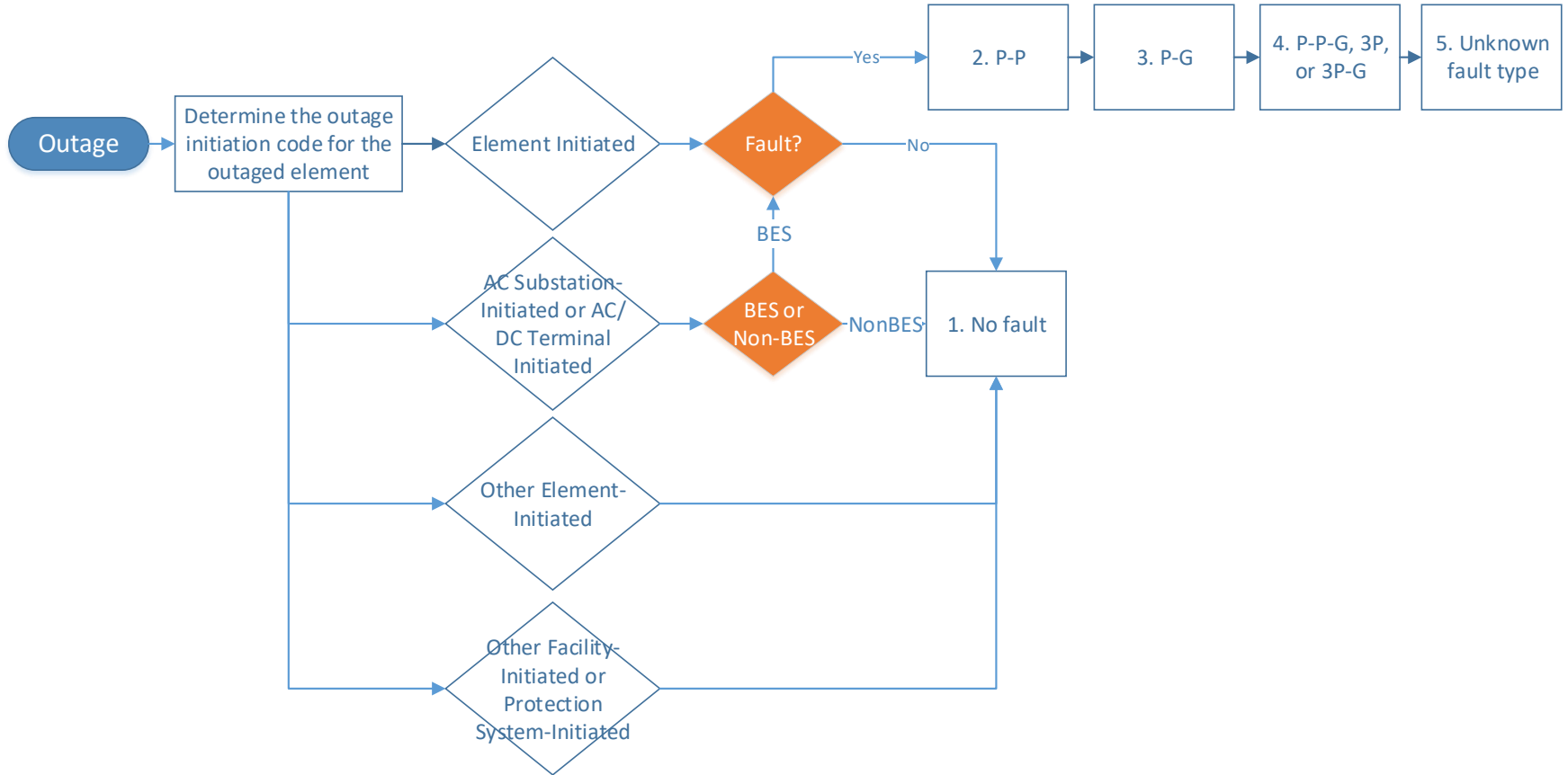
Selecting Fault Type for Evolving Fault

- 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.

Best methods to determine fault type

- 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.

Fault Type Flow Chart



Example 1

- 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>

Example 3

- 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>

Example 4

- 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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RELIABILITY CORPORATION

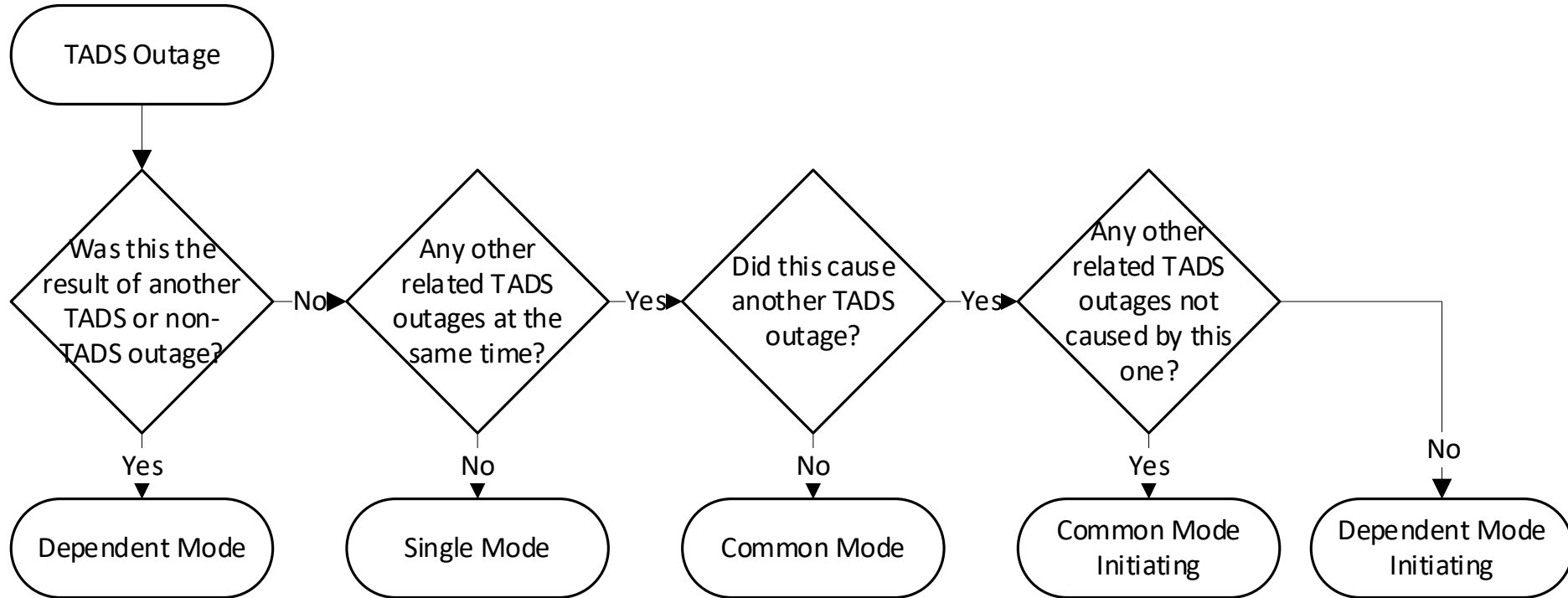
Outage Modes

October 2023

RELIABILITY | RESILIENCE | SECURITY

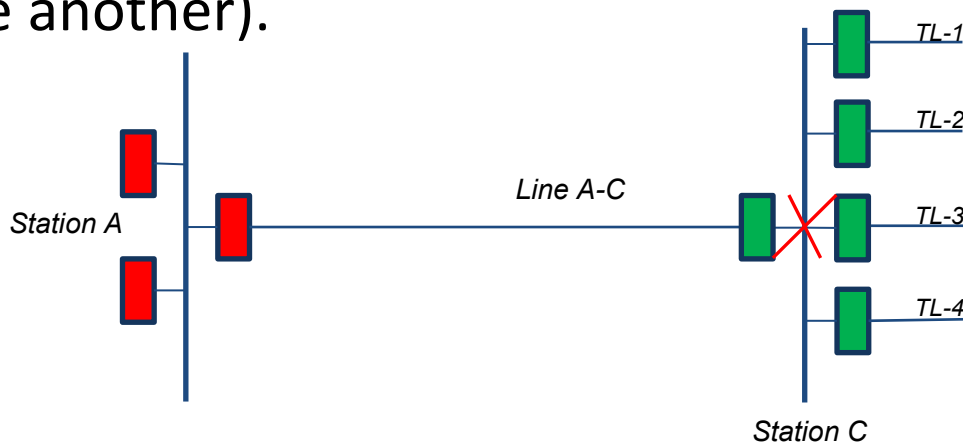


- The Outage Mode Code describes whether an Automatic Outage is related to other Automatic Outages.
 - Single Mode Outage
 - Dependent Mode Initiating Outage
 - Dependent Mode Outage
 - Common Mode Outage
 - Common Mode Initiating Outage



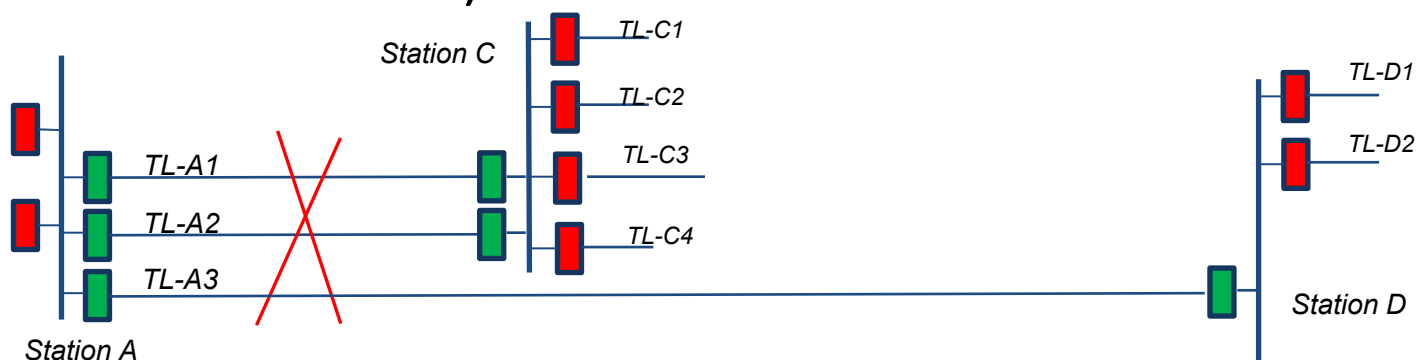
An Automatic Outage of a single Element that occurred independent of any other Automatic Outages (if any).

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*

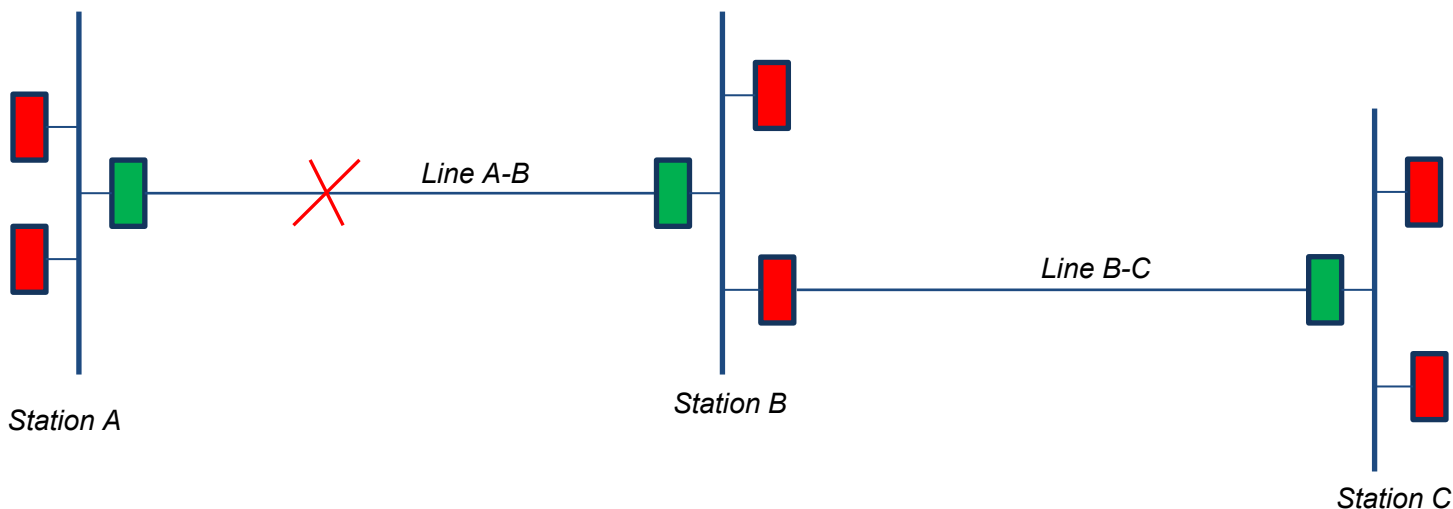
One of **two or more** Automatic Outages with the **same Initiating Cause Code** and where the outages are not consequences of each other and occur nearly **simultaneously** (i.e., within cycles or seconds of one another).



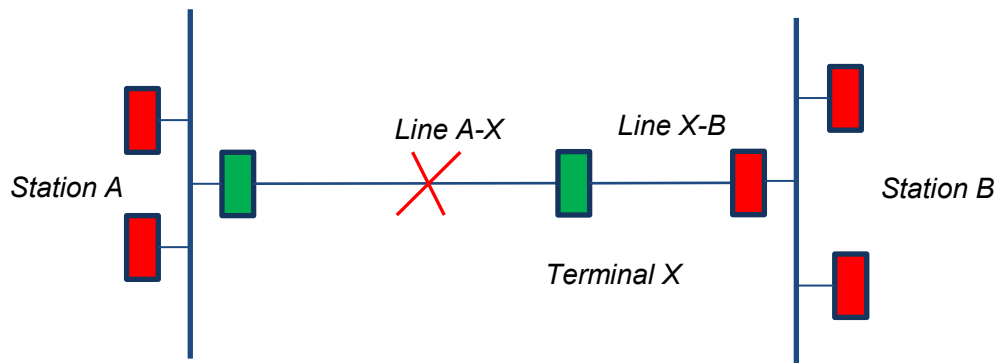
- Single 'Cause' (Lighting, Tornado, etc.), near simultaneous:
 - Do they share tower (River Crossing?) – Common Mode
 - Are they in close proximity, share ROW – Common Mode

- 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

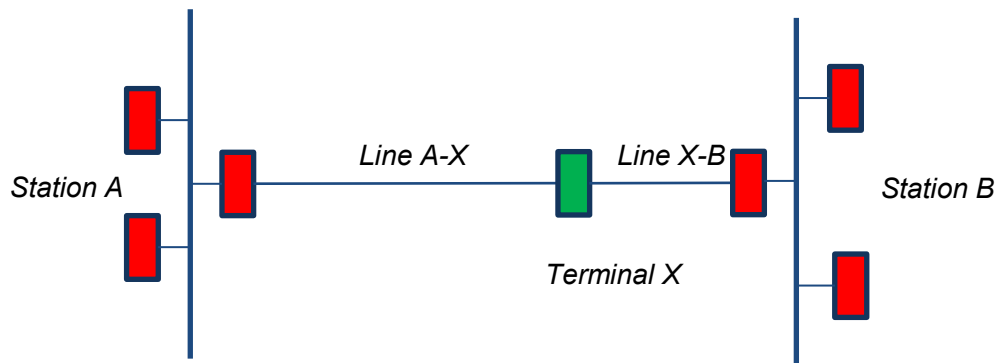
- Line A-B experiences a fault and Line B-C erroneously trips (relay overtrips) at Station C.
 - Line A-B – Dependent Mode Initiating Outage
 - Line B-C – Dependent Mode Outage



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

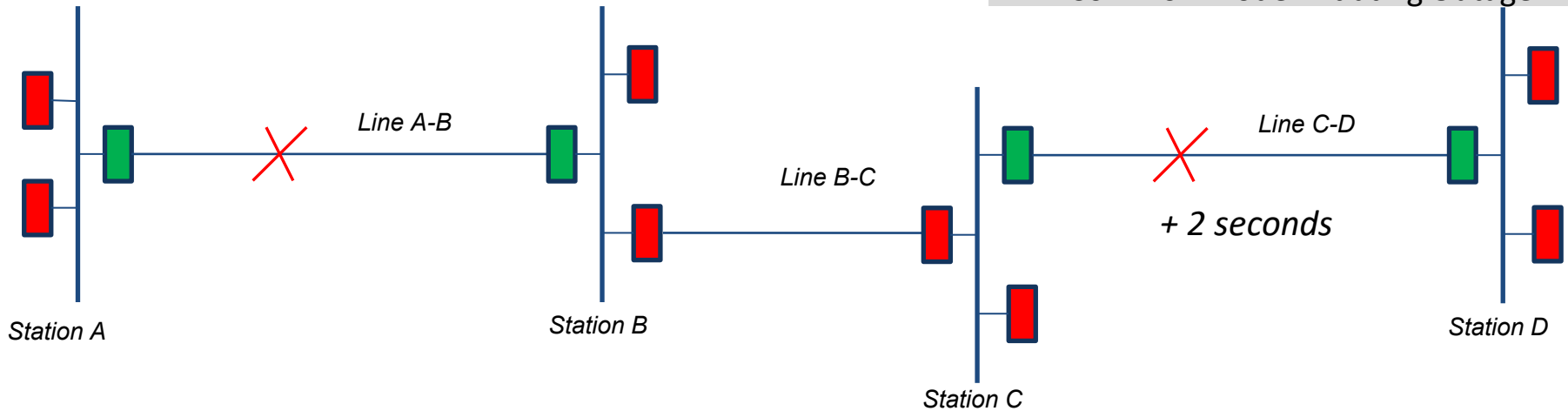


- Breaker at Terminal X trips due to low SF6 gas:
 - Line A-X: Common mode
 - Line X-B: Common mode



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.

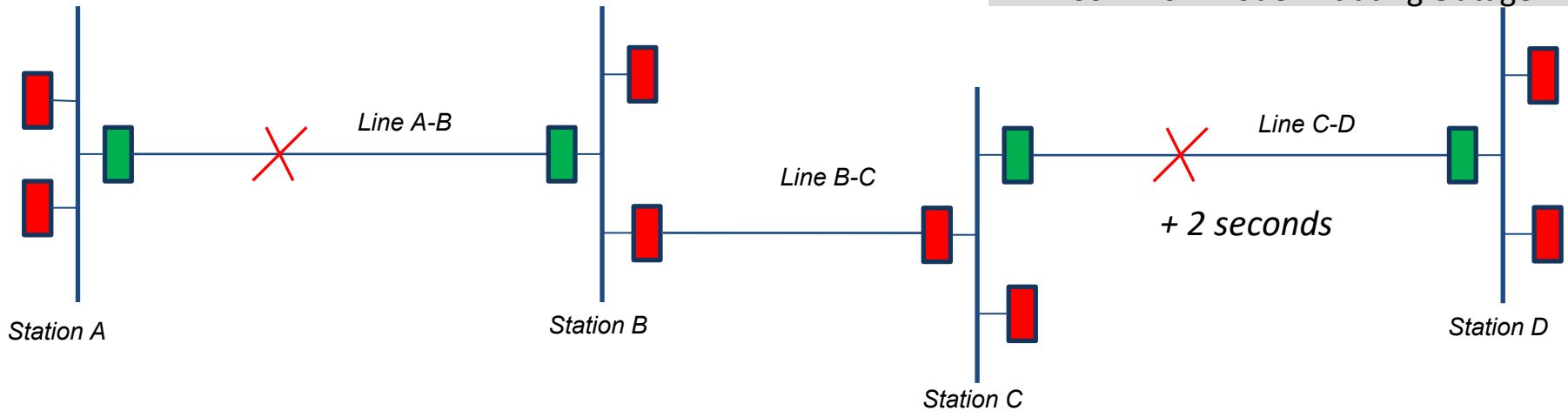
What is the Outage Mode Code for Line A-B?



- 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.

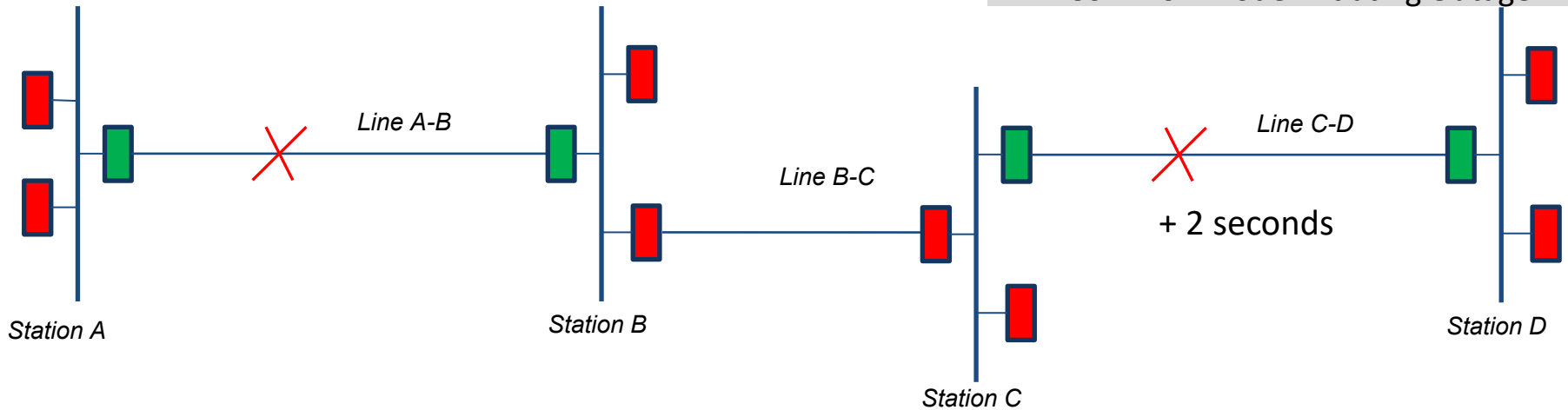
What is the Outage Mode Code for Line A-B?



- 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.

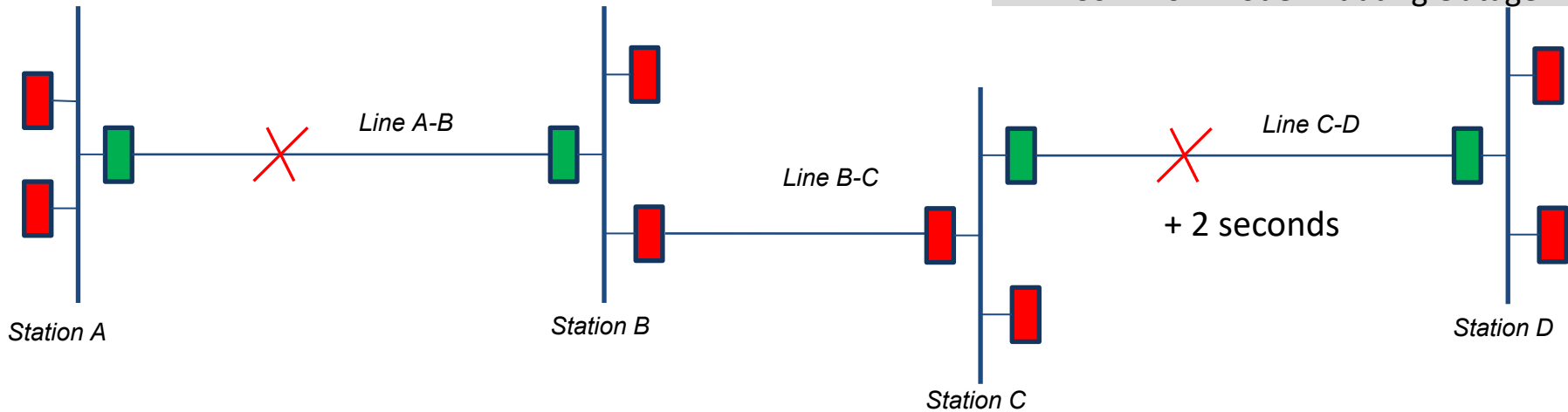
What is the Outage Mode Code for Line C-D?



- 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?

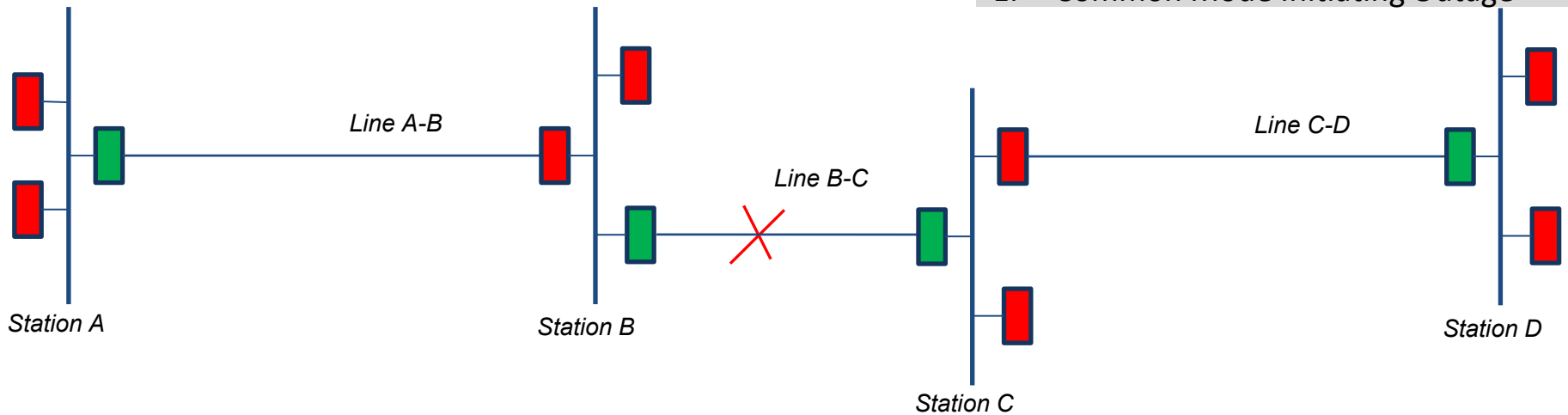


- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

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

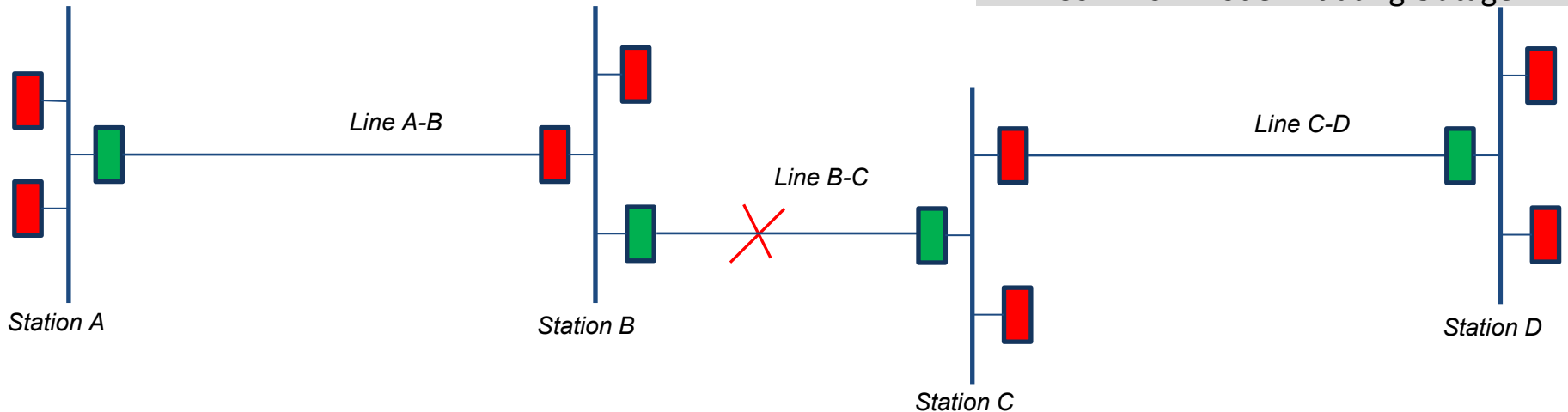
What is the Outage Mode Code for Line B-C?

- 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?

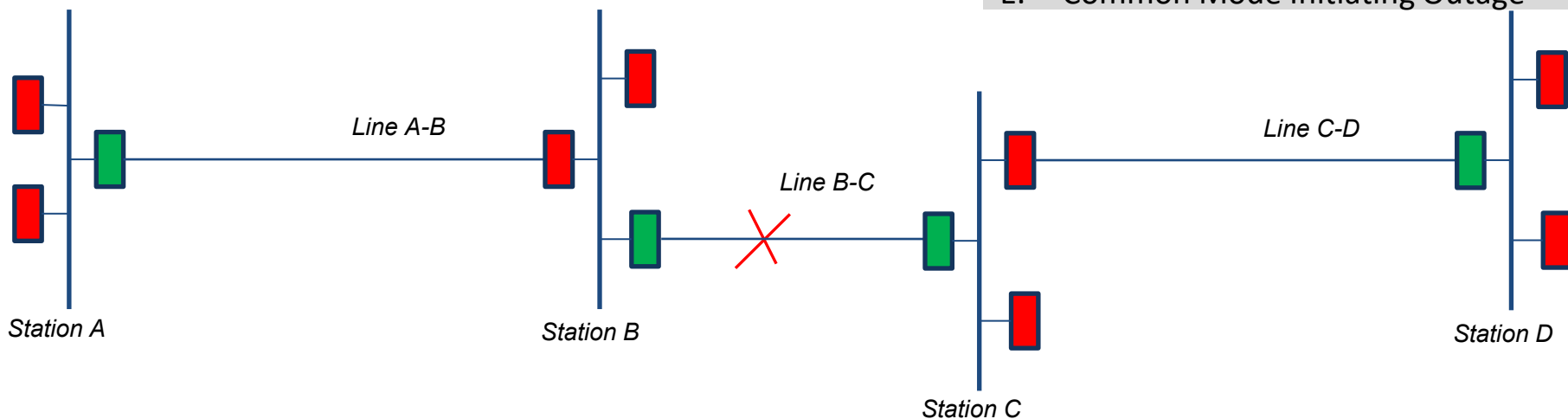


- A. Single Mode Outage
- B. Dependent Mode Initiating Outage**
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage

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?

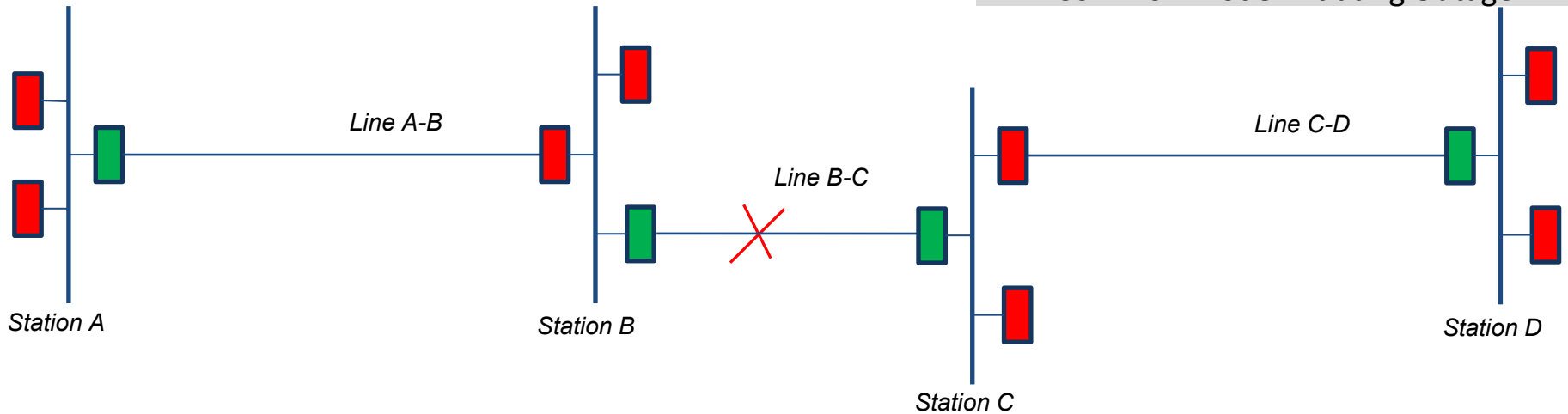
- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage



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?

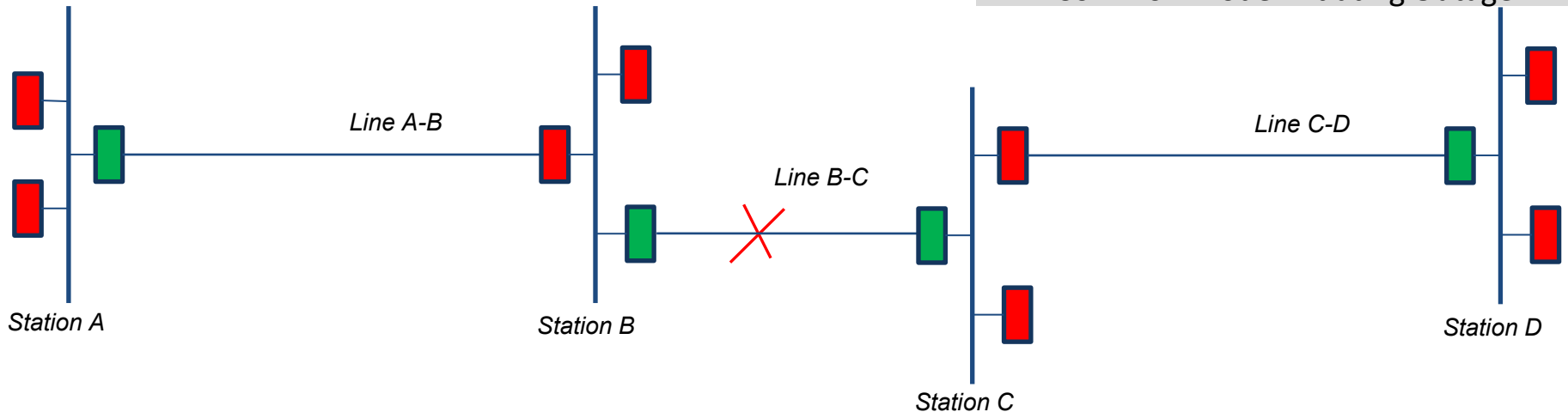
- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage**
- D. Common Mode Outage
- E. Common Mode Initiating Outage



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?

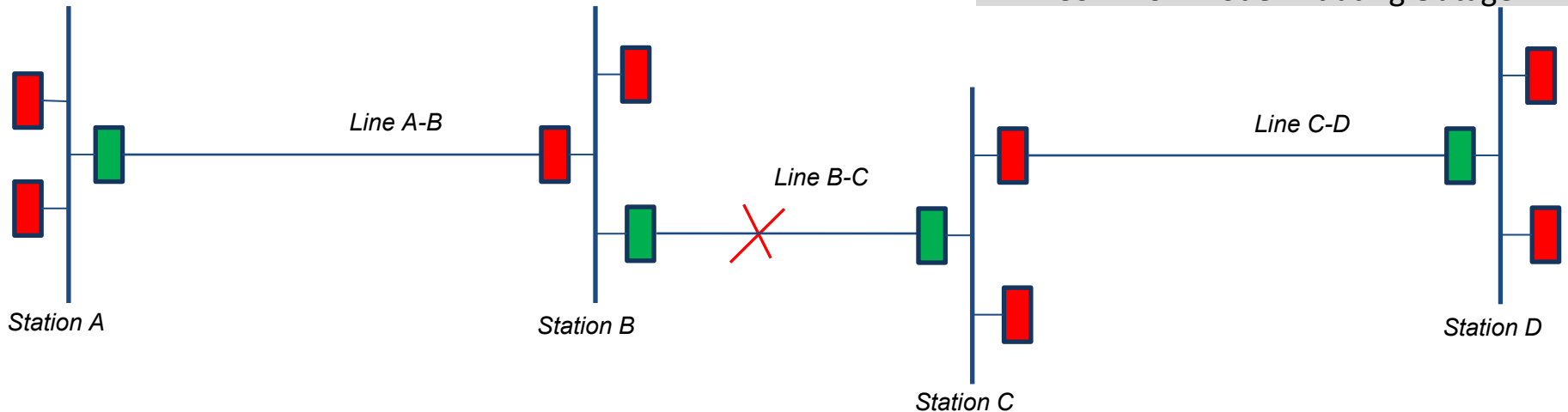
- A. Single Mode Outage
- B. Dependent Mode Initiating Outage
- C. Dependent Mode Outage
- D. Common Mode Outage
- E. Common Mode Initiating Outage



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

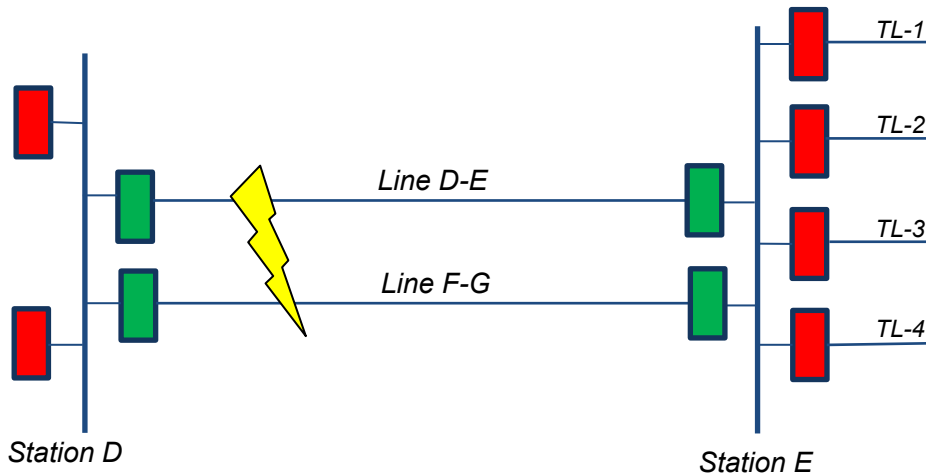
What is the Outage Mode Code for Line C-D?

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



Line D-E and F-G both experience a fault due to lightning on a common tower. All elements are BES elements.

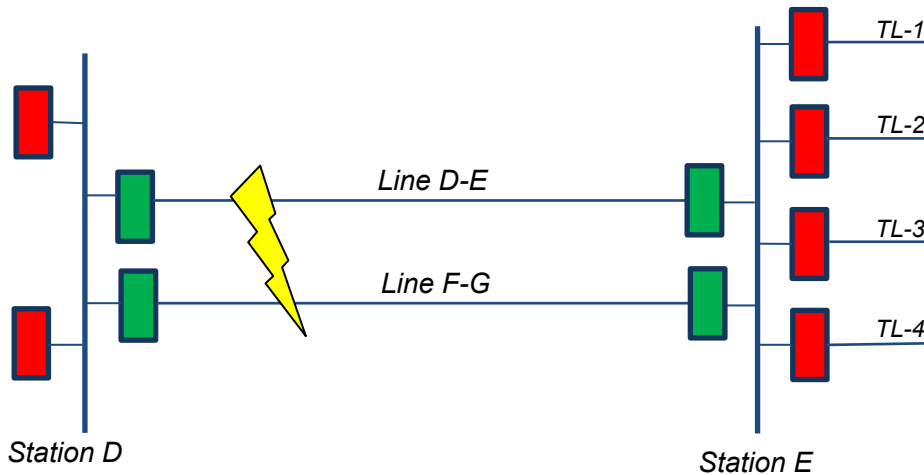
What is the Outage Mode Code for Line D-E?



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

Line D-E and F-G both experience a fault due to lightning on a common tower. All elements are BES elements.

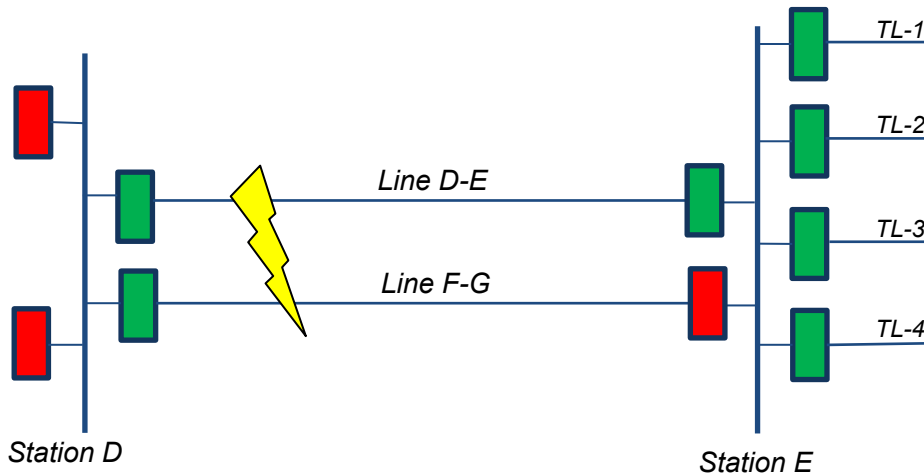
What is the Outage Mode Code for Line D-E?



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

Line D-E and F-G both experience a fault due to lightning on a common tower. A breaker at station E on the F-G line fails to open resulting in the bus at station E locking out. All elements are BES elements.

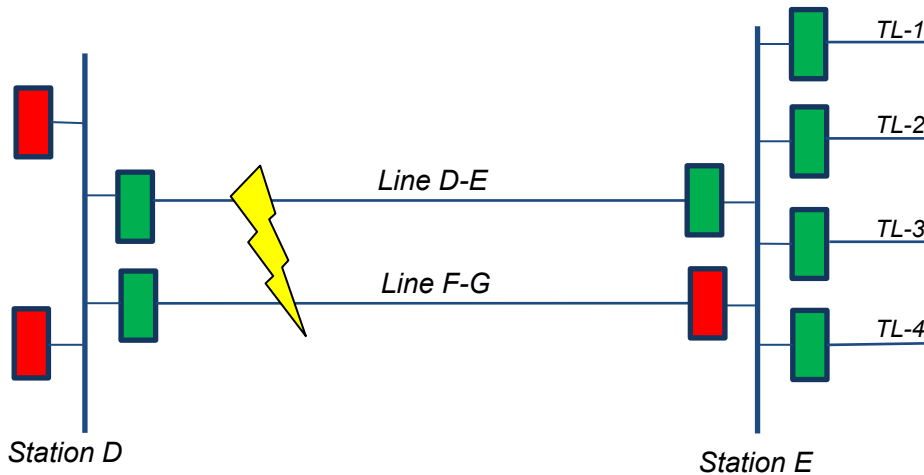
What is the Outage Mode Code for Line D-E?



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

Line D-E and F-G both experience a fault due to lightning on a common tower. A breaker at station E on the F-G line fails to open resulting in the bus at station E locking out. All elements are BES elements.

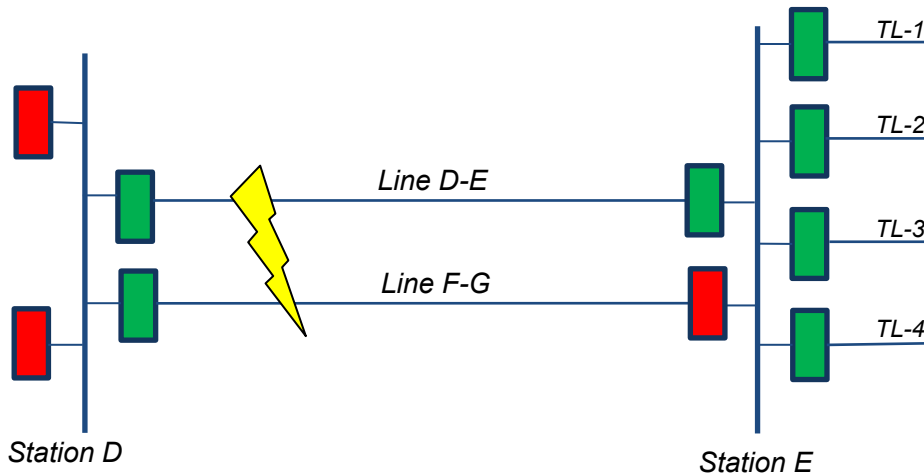
What is the Outage Mode Code for Line D-E?



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

Line D-E and F-G both experience a fault due to lightning on a common tower. A breaker at station E on the F-G line fails to open resulting in the bus at station E locking out. All elements are BES elements.

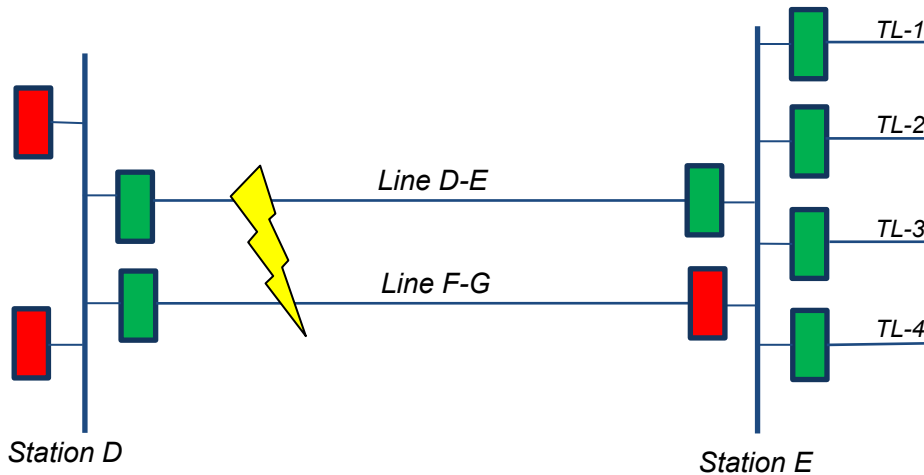
What is the Outage Mode Code for Line F-G?



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

Line D-E and F-G both experience a fault due to lightning on a common tower. A breaker at station E on the F-G line fails to open resulting in the bus at station E locking out. All elements are BES elements.

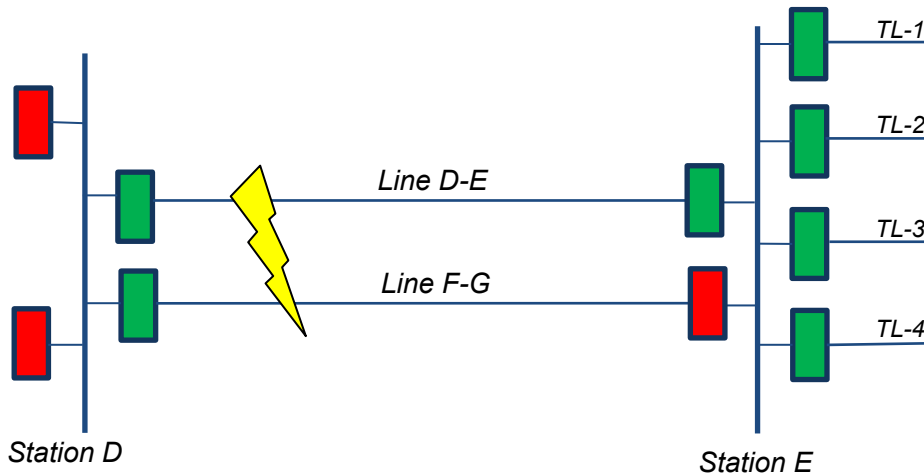
What is the Outage Mode Code for Line F-G?



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

Line D-E and F-G both experience a fault due to lightning on a common tower. A breaker at station E on the F-G line fails to open resulting in the bus at station E locking out. All elements are BES elements.

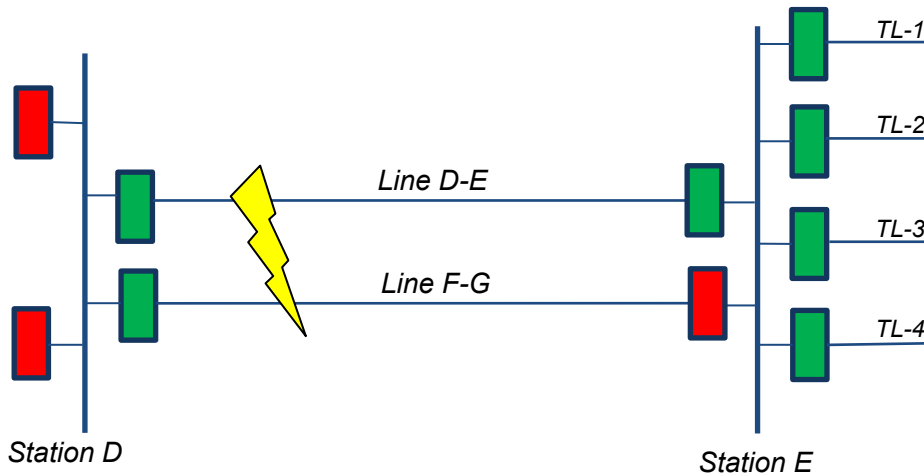
What is the Outage Mode Code for Lines TL-1, TL-2, ...?



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

Line D-E and F-G both experience a fault due to lightning on a common tower. A breaker at station E on the F-G line fails to open resulting in the bus at station E locking out. All elements 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 2023

RELIABILITY | RESILIENCE | SECURITY



Outage ID Code

- 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 or Sustained

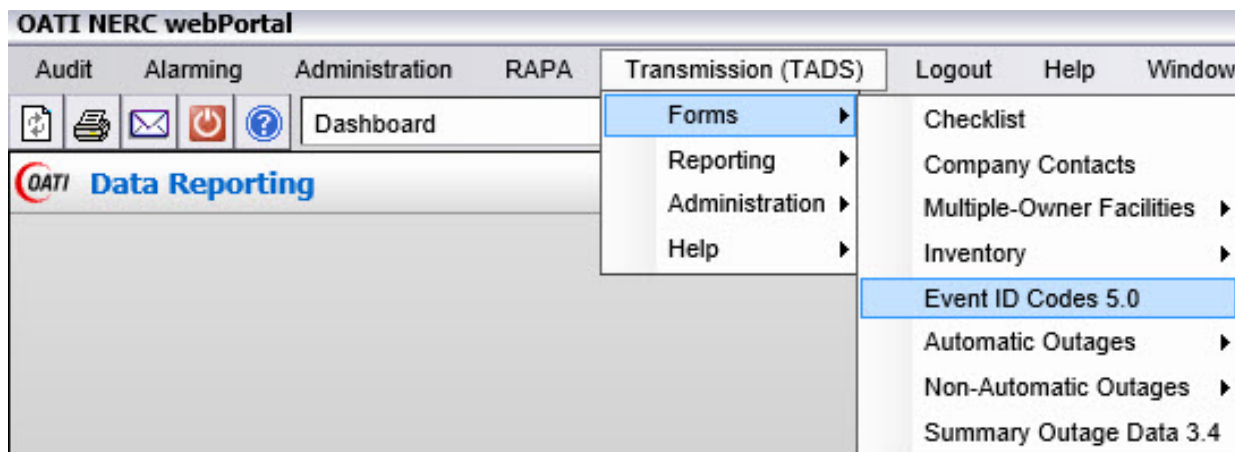
- **Momentary Outage:**
 - An Automatic Outage with an Outage Duration less than one minute.
 - If the circuit recloses and trips again within less than a minute of the initial outage, it is only considered one outage. The circuit would need to remain in service for longer than one minute between the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

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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:
Event Type Number: 62 Security (unintended operation).
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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- 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.nerc.com/pa/rrm/ea/Pages/EA-Program.aspx>

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Brief Report Template

Reported Event Title:			
Event Date:		Submittal Date:	
Subsequent Submittal Date:		Initial, Interim or Final Report:	
Region(s):			
1. Entity Name:			
NCR Number:			
2. Contact Person:		Phone Number:	
Email:			
3. Date of Disturbance			
Time of Disturbance		Time Zone:	
4. Brief Description of Event			
5. Proposed Event Categorization: (e.g., 1a, 2b, 3c)			

	disturbance (Hz MIN)			
8. Demand Interrupted				
Firm (MW)				
Interruptible (MW)				
9. Number of affected customers				
Firm		Interruptible		
10. List Transmission, Substation, Generation, and Demand that Experienced a Forced Outage (Excluding successful automatic reclosing)				

Appendix C: Brief Report Template - Effective 1/1/2020

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Transmission Lines				
Line Name	Voltage Level	Start time of outage	End time of outage	Total outage duration time

Substation Equipment					
Station Name (including station configuration)	Type (e.g. breaker, transformer, bus, relay, CT, PT)	Voltage Level	Start time of outage	End time of outage	Total outage duration time

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16. Identify any GADS, DADS, TADS, or Protection System Misoperations Reports that will be submitted

Event ID Code New

- 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 modal dialog box titled 'Message from webpage' is open in the foreground, 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

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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

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

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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

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**

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

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

Buttons: Modify, Delete, Audit, Close

Message from webpage
? You are about to modify Event ID Code.
Do you want to continue?
Buttons: OK, Cancel

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- **Event ID Code is Modified**

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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***



Filter	Value	Show
Reporting Period:	2017	Auto
Company:	[dropdown]	Auto
Event Type Number:	ALL	Auto
Event ID Code:	[dropdown]	Auto

Buttons: 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.

The screenshot shows the NERC web portal interface for Event ID Codes (5.0). The navigation menu includes Audit, Alarming, Administration, RAPA, Generation (GADS), Demand Response (DADS), Transmission (TADS), Logout, Help, and Window. The current page is titled "Event ID Codes (5.0)" and shows a reporting period of 2017 for the company NERC. The main content area displays a table of event codes with the following data:

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.

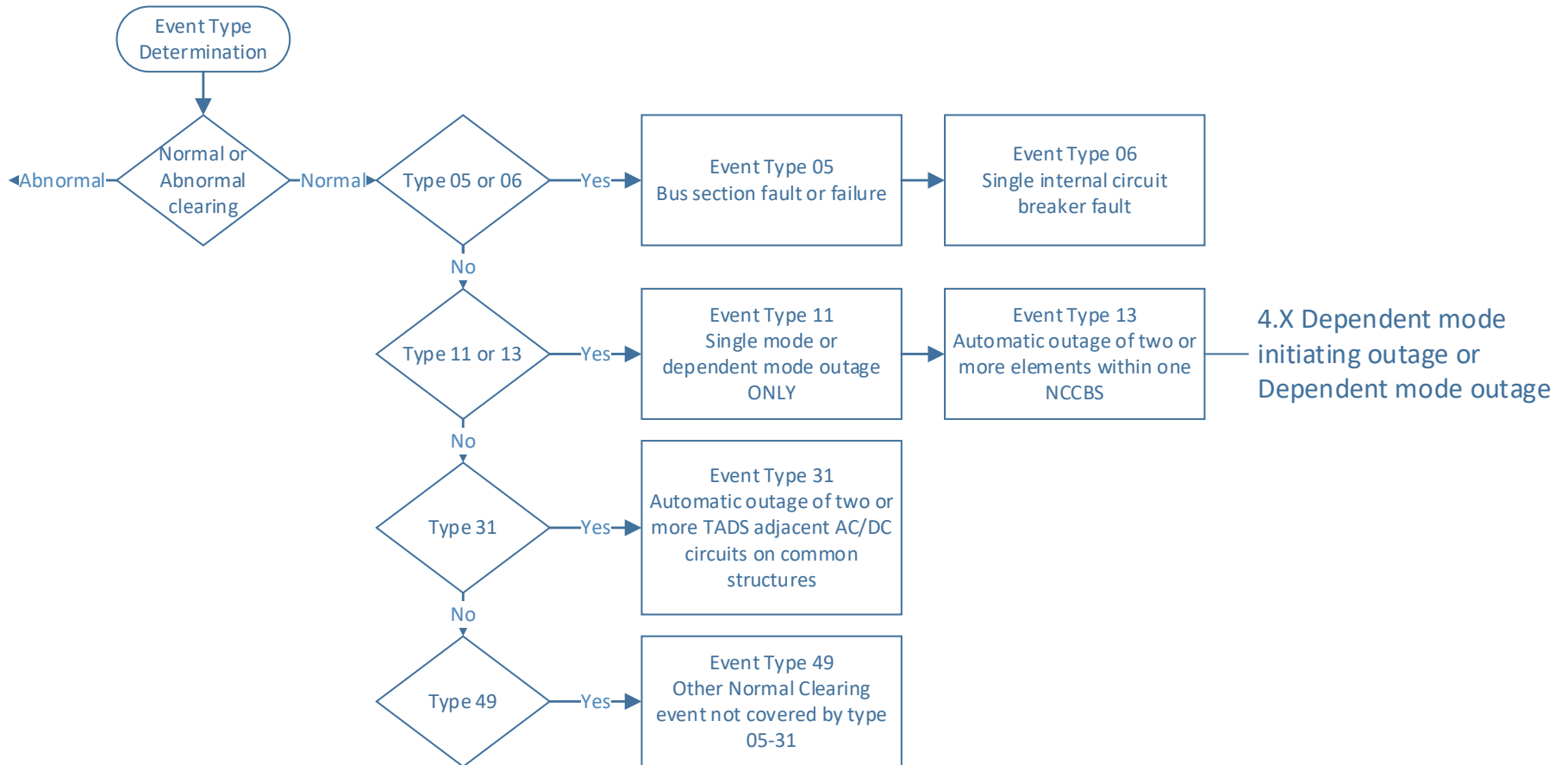
The interface also shows a footer with the text "©1999 - 2017 OATI NERC webPortal™SM (1.0) - Open Access Technology International, Inc. All Rights Reserved." and a status bar indicating "Page 1 of 1" and "Records 1-30 of 30".

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Events with Normal Clearing

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.

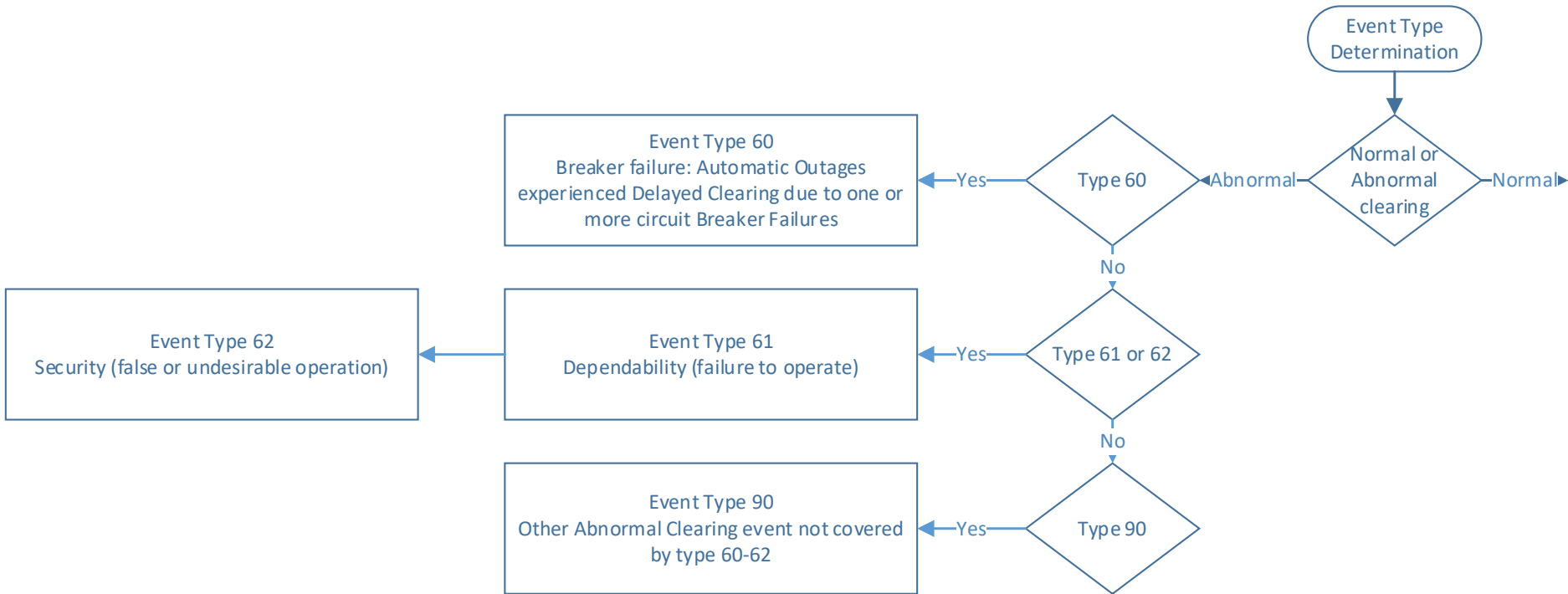
Event Type – Normal Clearing



Events with Abnormal Clearing

Event Type No.	Description
60	Breaker Failure: One or more Automatic Outages with Delayed Fault Clearing due to a circuit breaker being stuck, slow to open or failure to interrupt current.
61	Dependability (failure to operate): One or more Automatic Outages with Delayed Fault Clearing due to 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



Normal Clearing Event Type Numbers

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.

Normal Clearing Event Type Numbers

Which of these isn't an actual event code?

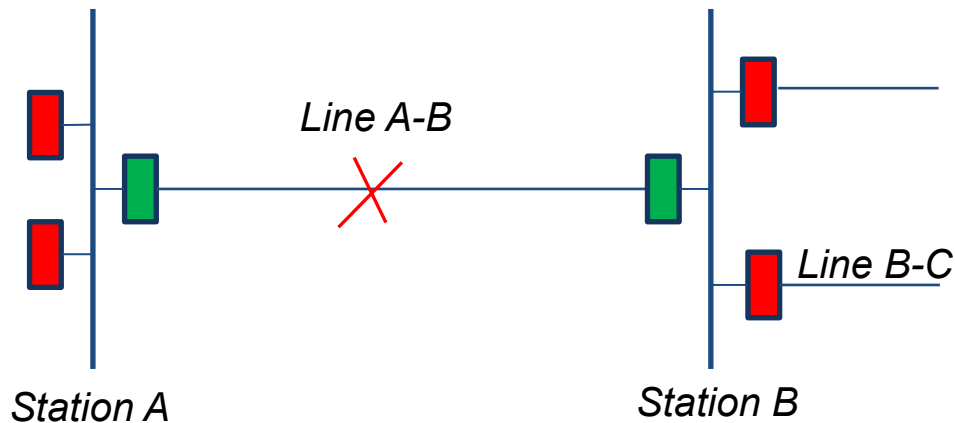
Event Type Number Descriptions: Events with Abnormal Clearing

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.

Example 1: Event Type

A fault occurs on Line A-B.

What is the Event Type No. for the Event?

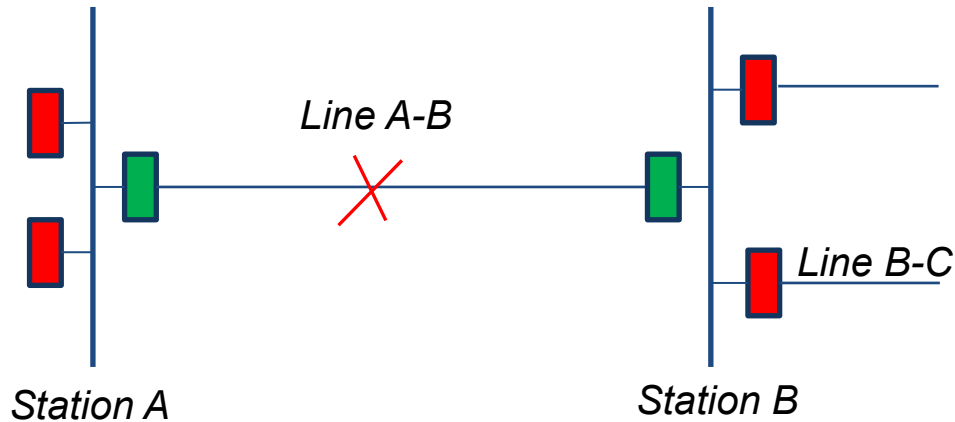


- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 13 – Two or more Elements within one NCCBS.
- E. 31 – Two or more adjacent AC Circuits on common structures
- F. 60 – Breaker Failure to Operate

Example 1: Event Type

A fault occurs on Line A-B.

What is the Event Type No. for the Event?

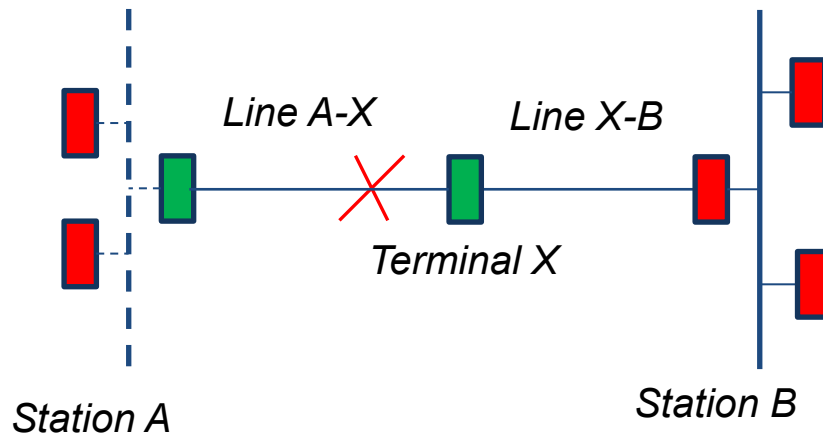


- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 13 – Two or more Elements within one NCCBS.
- E. 31 – Two or more adjacent AC Circuits on common structures
- F. 60 – Breaker Failure to Operate

Example 2: Event Type

A fault on AC Circuit 'A-X'.

What is the Event Type No. for the Event?

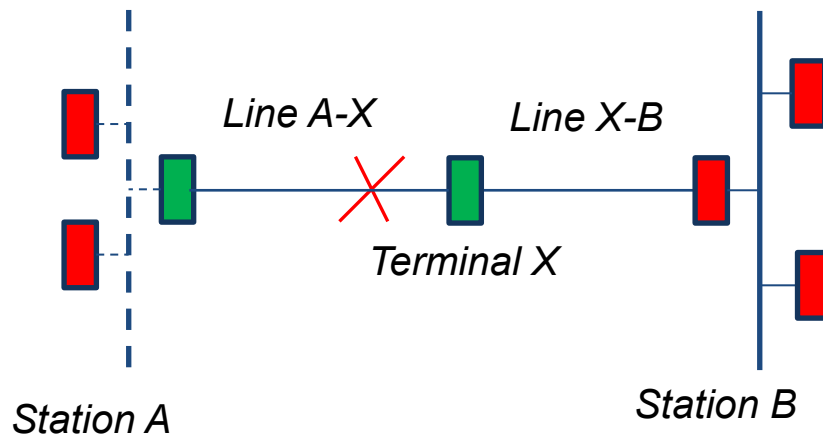


- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 13 – Two or more Elements within one NCCBS.
- E. 31 – Two or more adjacent AC Circuits on common structures
- F. 60 – Breaker Failure to Operate

Example 2: Event Type

A fault on AC Circuit 'A-X'.

What is the Event Type No. for the Event?

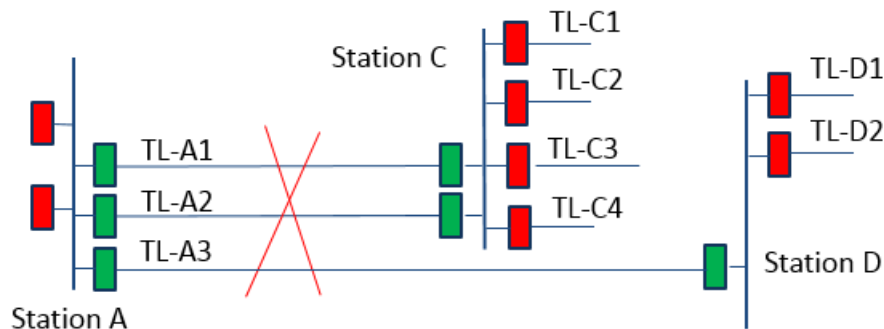


- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 13 – Two or more Elements within one NCCBS.**
- E. 31 – Two or more adjacent AC Circuits on common structures
- F. 60 – Breaker Failure to Operate

Example 3: Event Type

Tornado destroys a rivers crossing tower shared by 3 lines.

What is the Event Type No. for the Event?

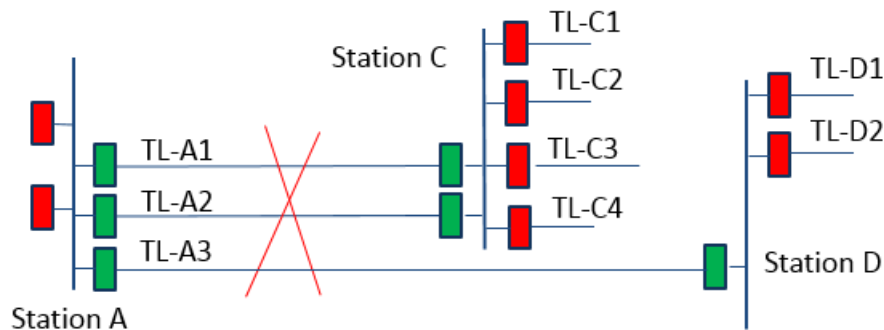


- A. 05 – Bus Section Fault
- B. 06 – Circuit Breaker Fault
- C. 11 – Automatic of Single not covered in 05 or 06
- D. 31 – Two or more adjacent AC Circuits on common structures
- E. 60 – Breaker Failure to Operate
- F. 61 – Dependability – Failure to Operate

Example 3: Event Type

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

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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NERC Multiple Utility (NMU) Event ID Codes

October 2023

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- Special Event ID Code that ties related outages crossing Transmission Owners (TOs)
- Combines related multiple-TO outages into a single NMU Event ID
- Same NMU Event ID is used for all TADS related outages involved in the same event
- All TOs will use the same NMU Event ID
- Created within webTADS by the TO

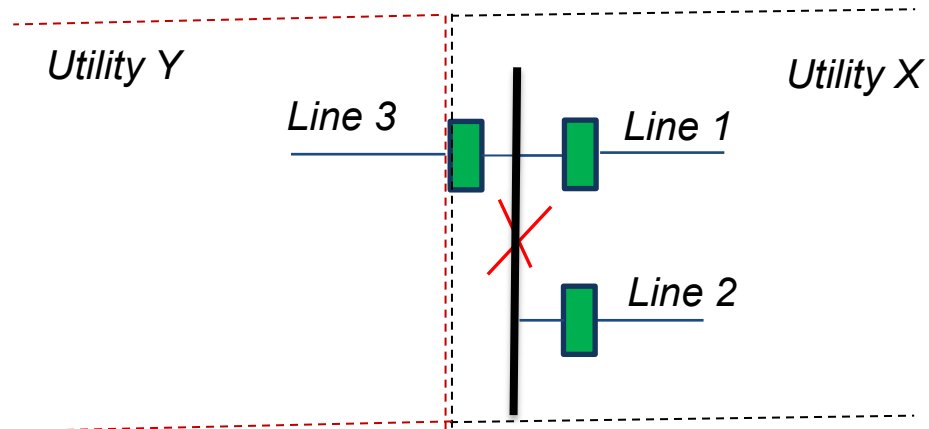
NMU Example – Bus Fault

Bus fault at Utility X Substation:

Utility X Lines 1 and 2 Trip

Utility Y Line 3 Trip

Utility X creates NMU for event and informs Utility Y to use it for Line 3 trip



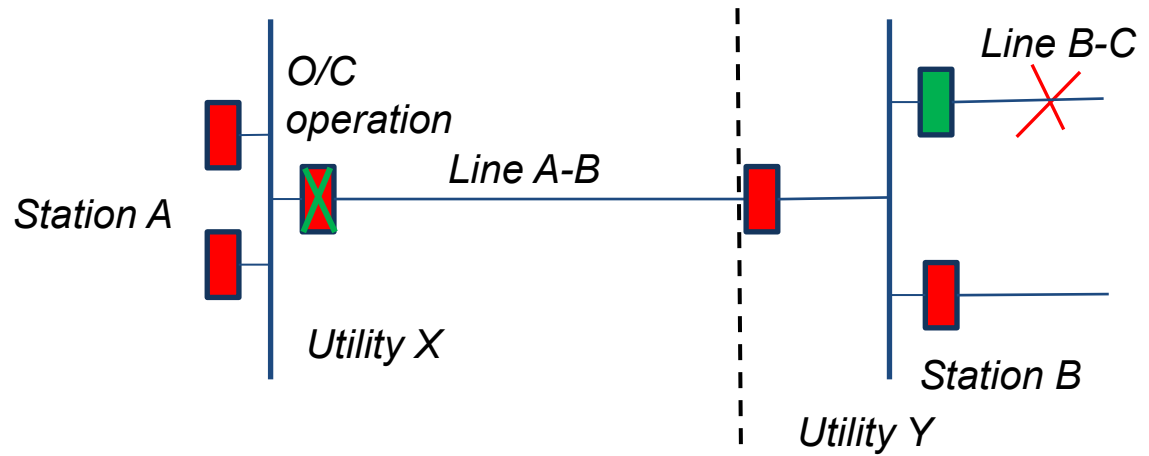
MNU Example – Overtrip

Utility Y has a sustained fault on B-C Line

Utility X has breaker trip
and successfully reclose
high speed on Line A-B
at Station A

If voltage is less than 200kV
a NMU is not created
because momentary
outages are not reported

If voltage is greater than or equal to 200kV
an NMU is created – Line B-C and Line A-B outages are reported under the same NMU
event.



NMU Example - Shared Line

Utility Y has a sustained fault on B-C Line.

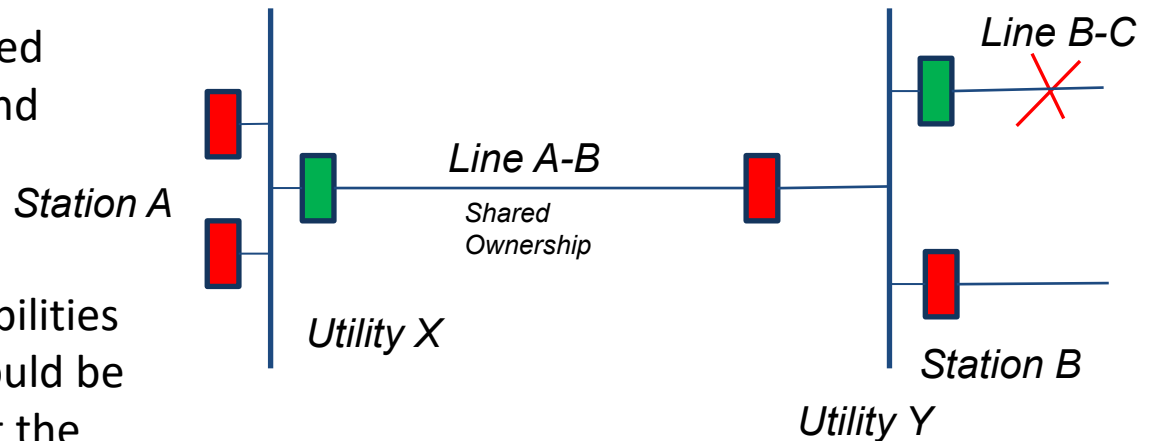
Utility X has breaker trip

with no reclose on Line A-B

at Station A. Line A-B has shared ownership between Utility X and Utility Y

If Utility X has reporting responsibilities for Line A-B an NMU Event should be created. Utility X would report the Line A-B outage and Utility Y would report the Line B-C outage under the same NMU Event.

If Utility Y has reporting responsibilities for Line A-B an NMU Event would not be created. Utility Y would report both line outages under the same Event.

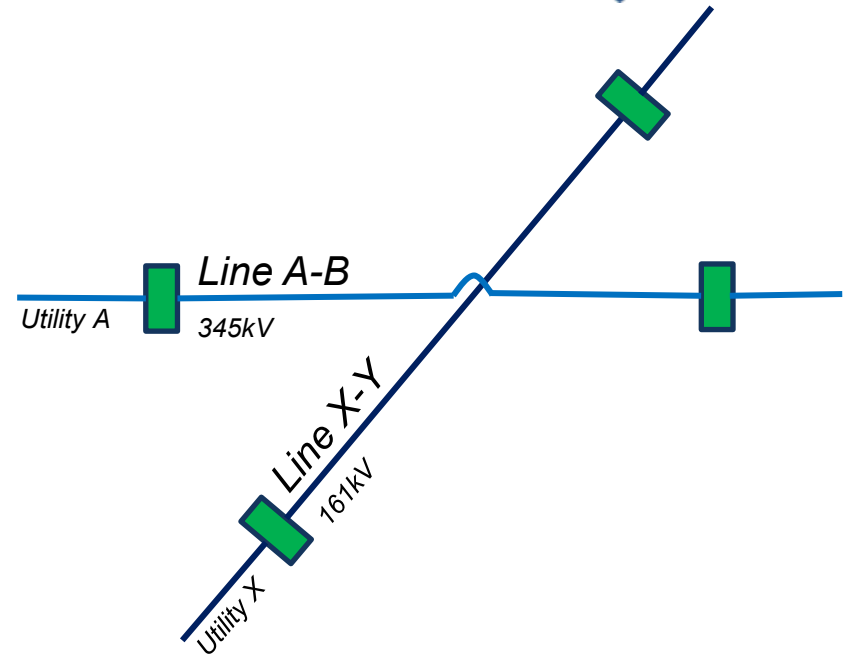


MNU Example – Cross Country Fault

Utility X has a 161kV line that passes under Utility A's 345kV line.

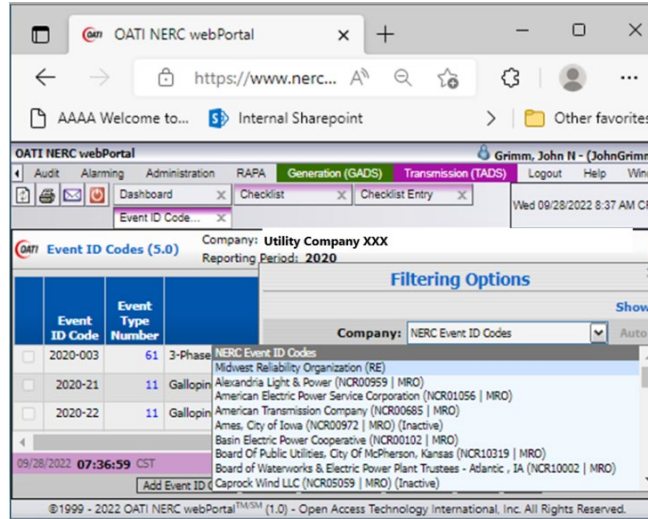
During a winter Storm they gallop into each other. Each line trips and has a sustained outage

Since both lines had sustained outages an NMU event should be created and both outages reported under the NUM.

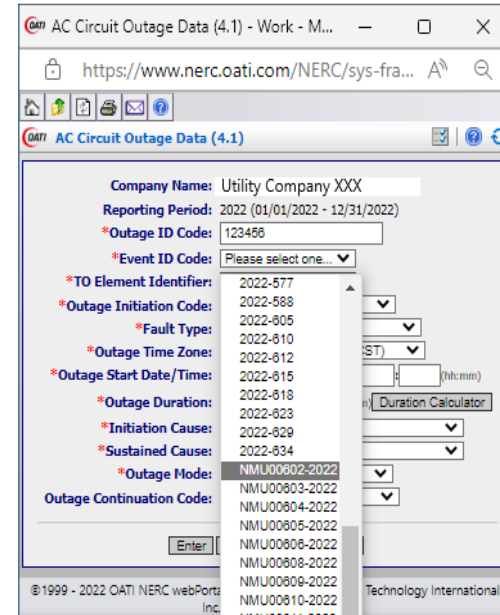


Reminders

When Creating NMU Events
select “NERC Event ID Codes”
in the Company drop down
box in Form 5.



NMU Events should show up in the Event ID code drop down box
in Forms 4.X



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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Validating Your Data

October 2023

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Form 3.1: AC and DC Circuit Detailed Inventory Data

- Invalid Retirement Date. 'Retirement Date' must be within the reporting period range.
- Change/Reconfiguration Date is missing
- Mismatched Precursor Elements. Precursor Elements does not belong to provided Voltage Class (KV) or Circuit Type.
- Duplicate Element Identifier in the file
- Circuit Type is missing
- Invalid KV
- In Service date cannot be set after the Outage(s) creation date on this inventory. Either adjust the Inventory In Service date or Outage start date
- Circuit Mileage is missing
- Invalid To Bus

- High Side kV is missing
- Low Side kV is missing
- Duplicate Element Identifier in the file
- Invalid Retirement Date. 'Retirement Date' must be within the reporting period range.
- Invalid Change/Reconfiguration Date. 'Change/Reconfiguration Date' must not be in the future or must be prior to the 'Retirement Date'.
- Invalid High or Low Side Voltage
- Invalid Three Phase Rating

- Warning - For Outage ID [] associated with Event ID [], 'Failed Protection System Equipment' was entered as the 'Initiating Cause Code.' Therefore the cause of this outage is likely to be abnormal clearing (per NERC definition of Normal Clearing). However, the associated Event Type number entered on Form 5 is less than 50, which are 'Normal Clearing' event types. Warning: Please consider entering an abnormal clearing Event Type Number on Form 5, or do not enter 'Failed Protection System Equipment' as the 'Initiating Cause Code' for this Outage.

- Event ID Code not in Form 5 of current period
- Outage ID Code [] has the Outage Continuation field entered as Continues into next period with a Start Date/Time = MM/DD/YYYY HH:MM [] timezone. However, the entered DURATION does not equal the HH:MM [] timezone [the EOYCD] remaining in the given reporting year. Enter a DURATION equal to HH:MM [the EOYCD], or change your data entry in the Outage Continuation Field.

- For a '0' duration outage, the Sustained Outage Cause Code must be 'N/A - Momentary'. Please enter this Sustained cause code OR change the Duration to a number greater than zero.
- For a duration outage greater than '0', the Sustained Outage Cause Code CAN NOT be 'N/A - Momentary'.
- Outage duration overlap other outage(s) in the XML with the same element.
- Duplicate Event ID Code and Element Identifier
- In XML file, Same Event ID Code is used with another outage having one of them as a Single mode outage
- Invalid Sustained Cause Code

- Outage Duration is invalid. (hhhh:mm) Max Duration: XXX:XX
- Invalid Fault Type
- Outage Duration is invalid. Format is hhhh:mm
- Sustained Cause Code is missing
- Outage continuation flag is missing (0,1,2)
- Outage Mode is missing
- Outage Duration is out of range in [] timezone. (Max duration: XXX:XX)
- Initiating Cause Code is missing
- Invalid Initiating Cause Code

- Event ID Code not in Form 5 of current period
- A transformer outage has been entered with zero outage duration, indicating the outage was momentary. Momentary transformer outages are rare. Please verify that the outage duration should be zero. If OK, please proceed. If not, enter a duration greater than or equal to 1 minute.

- Warning - For Outage ID [] associated with Event ID [], 'Failed Protection System Equipment' was entered as the 'Initiating Cause Code.' Therefore the cause of this outage is likely to be abnormal clearing (per NERC definition of Normal Clearing). However, the associated Event Type number entered on Form 5 is less than 50, which are 'Normal Clearing' event types. Warning: Please consider entering an abnormal clearing Event Type Number on Form 5, or do not enter 'Failed Protection System Equipment' as the 'Initiating Cause Code' for this Outage.

- Outage continuation flag is missing (0,1,2)
- Outage Initiation Code Name is missing
- Outage Mode is missing
- Fault Type is missing
- Invalid Outage Initiation Code Name
- Outage Duration is invalid. Format is hhhh:mm

- Outage ID Code [] has the Outage Continuation field entered as Continues into next period with a Start Date/Time = MM/DD/YYYY HH:MM [] timezone. However, the entered DURATION does not equal the HH:MM [] timezone [the EOYCD] remaining in the given reporting year. Enter a DURATION equal to HH:MM [the EOYCD], or change your data entry in the Outage Continuation Field.
- Sustained Cause Code is missing

ID Code and Event Type Number Data

- Duplicate Event ID Code
- Disturbance Report Filed flag is missing
- Event Type ID is missing
- Event ID Code is missing
- Warning - Event ID Code Found. Will not be updated on Append Action.
- Event ID Code exists in another Reporting Period: 2016

- Warning - An old version of xml schema is uploaded. We will not be processing extra field (Planned Cause Code) in the file.
- Outage Duration is invalid. (hhhh:mm) Max Duration: XXX.XX
- Outage duration overlap existing outage(s) with the same element.
- Planned Outage Cause Code CANNOT be 'NA'
- Planned outages are not allowed from year 2016 and forward.
- Outage Duration is missing or zero
- Outage Duration is invalid. Format is hhhh:mm
- For the selected 'Outage Continuation Code', the Outage Duration is out of range (Minimum Duration: XXX:XX)

- Outage continuation flag is missing (0,1,2)
- Outage Duration is out of range in [] timezone. (Max duration: XXX.XX)
- Outage duration overlap other outage(s) in the XML with the same element
- Outage ID Code [] has the Outage Continuation field entered as Continues into next period with a Start Date/Time = MM/DD/YYYY HH:MM [] timezone. However, the entered DURATION does not equal the HH:MM [] timezone [the EOYCD] remaining in the given reporting year. Enter a DURATION equal to HH:MM [the EOYCD], or change your data entry in the Outage Continuation Field.
- Operational Cause Code is missing

- Warning - An old version of xml schema is uploaded. We will not be processing extra field (Planned Cause Code) in the file.
- Outage Duration is invalid. Format is hhhh:mm
- Outage Duration is missing or zero
- Planned Cause Code is missing
- Planned Outage Cause Code CANNOT be 'NA'
- Planned outages are not allowed from year 2016 and forward.

Common Data Validation Errors

All fatal errors for completed forms must be fixed before checklist can be saved

Quarter	Form(s)	Validation Error Description
Quarter 1	3.2 & 6.3	No inventory exists on Form 3.2 for Form 6.3 Outage ID Code [11100100].
Quarter 2	3.2 & 4.3	No inventory exists on Form 3.2 for Form 4.3 Outage ID Code [11100000].
Quarter 2	3.2 & 4.3	No inventory exists on Form 3.2 for Form 4.3 Outage ID Code [01100100].
Quarter 2	3.2 & 6.3	No inventory exists on Form 3.2 for Form 6.3 Outage ID Code [11100100].
Quarter 3	3.2 & 6.3	No inventory exists on Form 3.2 for Form 6.3 Outage ID Code [11100104].
Quarter 3	3.2 & 6.3	No inventory exists on Form 3.2 for Form 6.3 Outage ID Code [11100107].
Quarter 3	3.2 & 6.3	No inventory exists on Form 3.2 for Form 6.3 Outage ID Code [11100109].
Quarter 4	3.1 & 6.1	No inventory exists on Form 3.1 for Form 6.1 Outage ID Code [1110010000a].
Quarter 4	3.1 & 6.1	No inventory exists on Form 3.1 for Form 6.1 Outage ID Code [1110010000b].

RED = Fatal Errors
 YELLOW = Warnings

All fatal errors for completed forms must be fixed before checklist can be saved

Quarter	Form(s)	Validation Error Description
5.0		No Form 4 outages assigned to Event ID [1110010000]. This Form 5 Event ID should be deleted or at least one outage on Form 4 should use this Event ID.

Fatal Errors
 W = Warnings

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Common Data Validation Errors

n(s)	Validation Error Description
Event ID "XXXXXX" is associated with just one Common Mode or Common Mode Initiating outage. At least one additional Common Mode or Common Mode Initiating outage must be associated with this event ID.	Event ID "XXXXXX" is associated with just one Common Mode or Common Mode Initiating outage. At least one additional Common Mode or Common Mode Initiating outage must be associated with this event ID.
Event ID "XXXXXX" is associated with just one Common Mode or Common Mode Initiating outage. At least one additional Common Mode or Common Mode Initiating outage must be associated with this event ID.	Event ID "XXXXXX" is associated with just one Common Mode or Common Mode Initiating outage. At least one additional Common Mode or Common Mode Initiating outage must be associated with this event ID.
Event ID "XXXXXX" is associated with just one Common Mode or Common Mode Initiating outage. At least one additional Common Mode or Common Mode Initiating outage must be associated with this event ID.	Event ID "XXXXXX" is associated with just one Common Mode or Common Mode Initiating outage. At least one additional Common Mode or Common Mode Initiating outage must be associated with this event ID.

The excel sheet will allow an AC outage to have the initiating cause code of Failed AC/DC Terminal Equipment to be selected but this is an invalid cause code for AC circuits. It is only valid for DC circuits (not sure if this is something we should just have NERC fix but it has caused issues).

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SLIDO QR Code



A stylized map of North America, including the United States, Canada, and Mexico. The map is rendered in shades of blue and grey, with the United States and Canada in a darker blue and Mexico in a lighter grey. The map is centered on the page and partially overlaid by a horizontal blue band.

Questions and Answers

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Transmission Availability Data System Reporting Training

October 2023

RELIABILITY | RESILIENCE | SECURITY



- A 115kV Phase Shifting Transformer tripped and locked out due to an internal fault. At the same instant that the PST failed, a remote 115kV transmission line terminal, not associated with the PST, tripped and reclosed in 5 seconds. This trip is due to a protection relay misoperation, but cannot be attributed to incorrect relay settings
- The 115kV line trip and automatic reclose in <1 minute would not normally require a TADS submittal. However, since the automatic outage of the PST was the initiating event for the misoperation of the remote 115kV line, should these be submitted as Dependent Mode Initiating (for the PST) and the Dependent Mode (for the 115kV line)?

- A: If the PST outage resulted in the 115kV line outage, it should be reported as a Dependent Mode Initiating outage, even though the 115kV line outage is not reportable as it was a momentary outage.

Updating Inventory for previous years

- Entities reviewing their inventories and notice something that hadn't been updated when it should have been
 - An element was added to their system in 2021 but they forgot to add it
 - An element was retired in 2020 but the change was never made
 - An element needs to be added but in-service date is in a previous year
- Elements are changing ownership from one Entity to another
- Entities and Regions aren't allowed to make these changes
- NERC will have to make change - Send email to tads@nerc.net
 - Please include your NCR
 - Complete Workbook Forms with updated data

Editing Outages from previous years.

- Outage started in 2022 and continued to 2023 had the incorrect Element ID associated with it.
- Outage from previous year has incorrect cause code
- Entities and Regions aren't allowed to make these changes
- NERC will have to make change - Send email to tads@nerc.net
 - Please include your NCR
 - Complete Workbook Forms with updated data

- Q: An ice storm caused multiple lines to trip due to conductor galloping. They occurred throughout the day and not at the same time. Would these be considered Common Mode Outages or Single Mode Outages?
- A: Single Mode outages. Even though each individual outage is caused by the same galloping conductor because there are not multiple outages occurring at the same time or very close to each other in time and the lines are back in service after each outage they are not considered common mode. If, for example, the galloping conductor causes an outage on a line and that line stays out, and the conductor causes another outage on another line which also stays out then those outages would be considered Common Mode

- Q: Could you elaborate as to what qualifies as a change/reconfiguration(column D in Table 3.2)?
- A: Column G (Change/Reconfiguration Data) is when the element was placed in-service. If this is unknown, use the January 1 of the current year you are reporting. If the element is altered/reconfigured in a way that would change its rating or voltage characteristics, then that date would be entered here.”

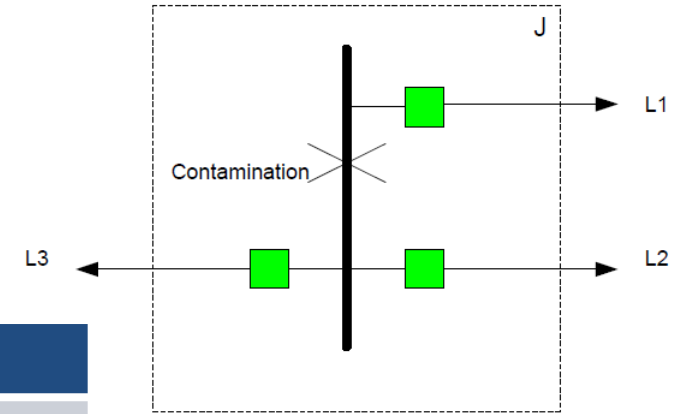
- Q: Why doesn't my 5.0 form show as complete?
- Q: Why does my TO statement show as incomplete?
- Q: I have entered data for Q1, why doesn't it show as complete?
- A: The Status column will show 'Completed' after all data for the reporting year is entered (Q1-Q4) and then reviewed by the Regional Coordinator.

Test Your Knowledge – Example 1

Single P-G fault on the Bus due to contamination, no damage resulted.

Which line(s) should this outage be reported for?

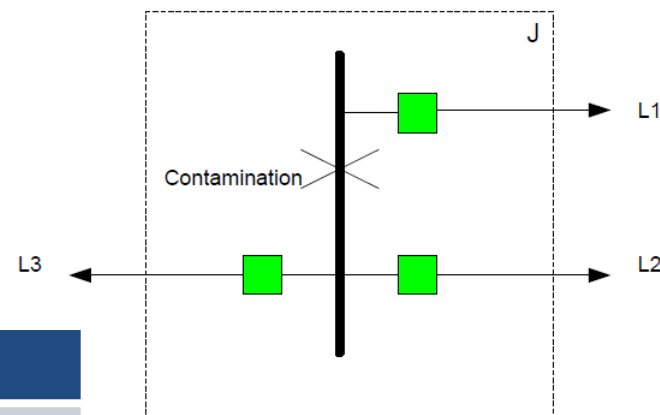
How would this be coded?



Fields	Form ___ L1, L2, L3	Form 5.0	
Fault Type		Event Type Number	
Outage Initiation Code			
Initiating Cause Code			
Sustained Cause Code			
Outage Mode Code			

Single P-G fault on the Bus due to contamination.

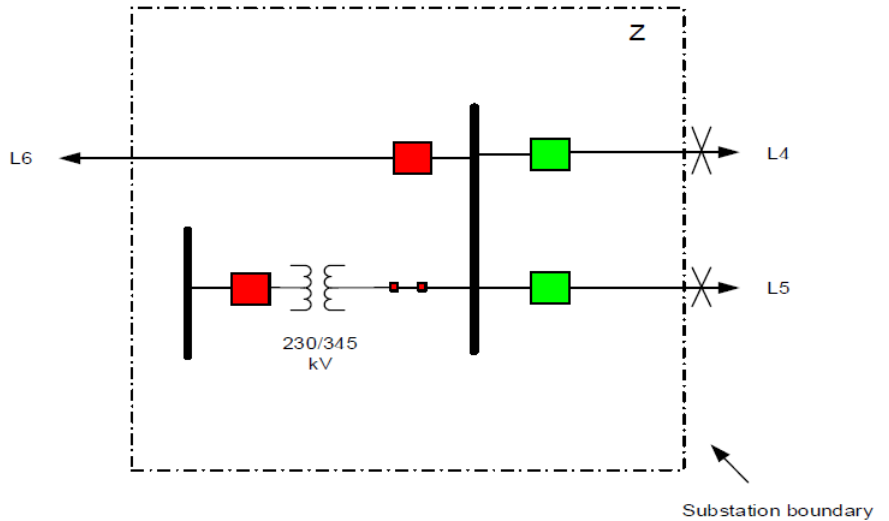
Individual outages should be reported on all three lines under the same event.



Fields	Form 4.1 L1, L2, L3	Form 5.0	
Fault Type	Single P-G fault	Event Type Number	05
Outage Initiation Code	AC Substation-Initiated		
Initiating Cause Code	Contamination		
Sustained Cause Code	Contamination		
Outage Mode Code	Common Mode		

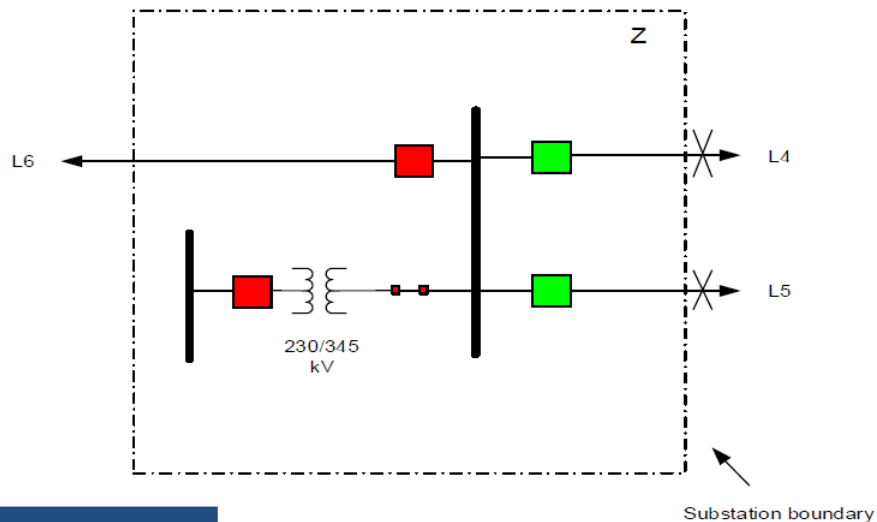
Test Your Knowledge – Example 2

Lines L4 and L5 are located on a common structure. A single lightning strike hits both circuits causing them to each experience a single phase to ground fault. Both breakers automatically reclose successfully and simultaneously.



Fields	Form ___ L4, L5	Form 5.0	
Fault Type		Event Type Number	
Outage Initiation Code			
Initiating Cause Code			
Sustained Cause Code			
Outage Mode Code			

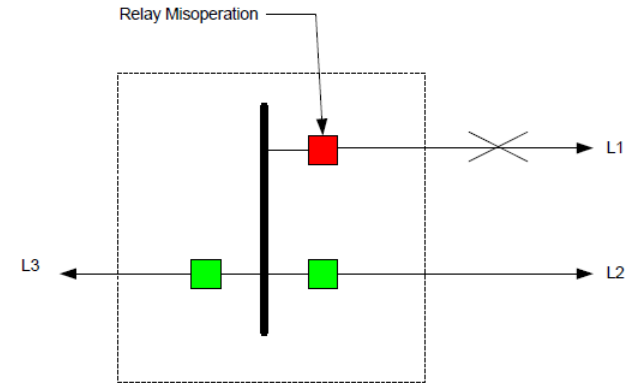
Lines L4 and L5 are located on a common structure. A single lightning strike hits both circuits causing them to each experience a single phase to ground fault. Both breakers automatically reclose successfully and simultaneously.



Fields	Form 4.1 L4, L5	Form 5.0	
Fault Type	Single P-G	Event Type Number	31
Outage Initiation Code	Element-Initiated		
Initiating Cause Code	Lightning		
Sustained Cause Code	NA – Momentary		
Outage Mode Code	Common Mode		

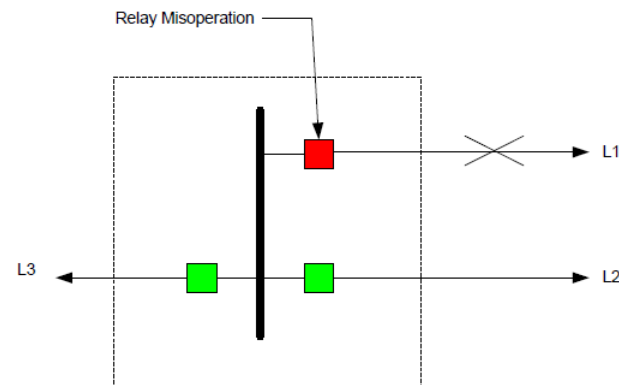
Test Your Knowledge – Example 3

A conductor breaks causing a phase to phase fault. The breaker on one end of the line fails to operate due to a relay Misoperation causing breakers on lines L2 and L3 to open.



Fields	Form ___ L1	Form ___ L2, L3	Form 5.0	
Fault Type			Event Type Number	
Outage Initiation Code				
Initiating Cause Code				
Sustained Cause Code				
Outage Mode Code				

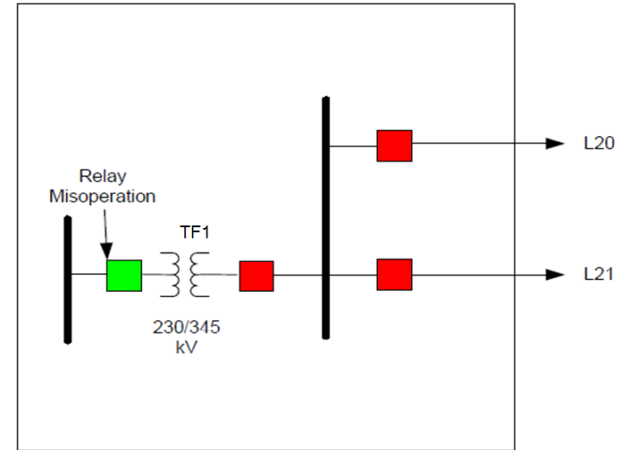
A conductor breaks causing a phase to phase fault. The breaker on one end of the line fails to operate due to a relay Misoperation causing breakers on lines L2 and L3 to open.



Fields	Form 4.1 L1	Form 4.1 L2, L3	Form 5.0	
Fault Type	P-P Fault	No fault	Event Type Number	61
Outage Initiation Code	Element-Initiated	Protection System-Initiated		
Initiating Cause Code	Failed AC Circuit Equipment	Failed Protection System Equipment		
Sustained Cause Code	Failed AC Circuit Equipment	Failed Protection System Equipment		
Outage Mode Code	Dependent Mode Initiating	Dependent Mode		

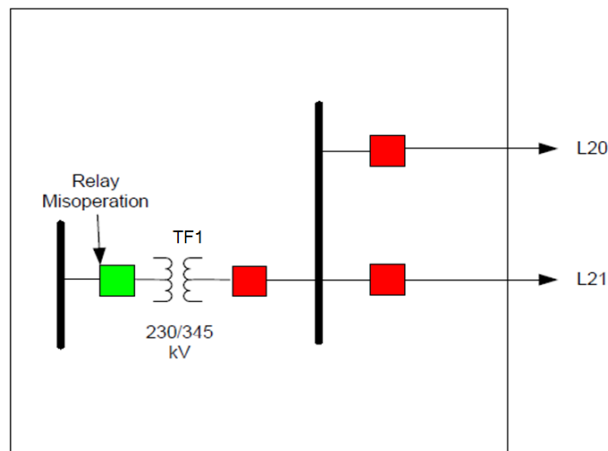
Test Your Knowledge – Example 4

A relay fails causing a 230/345 kV transformer outage.



Fields	Form __ TF1	Form 5.0	
Fault Type		Event Type Number	
Outage Initiation Code			
Initiating Cause Code			
Sustained Cause Code			
Outage Mode Code			

A relay fails causing a 230/345 kV transformer outage.



Fields	Form 4.3 TF1	Form 5.0	
Fault Type	No-Fault	Event Type Number	62
Outage Initiation Code	Protection System-Initiated		
Initiating Cause Code	Failed Protection System Equipment		
Sustained Cause Code	Failed Protection System Equipment		
Outage Mode Code	Single Mode		

Test Your Knowledge – Example 5

Galloping conductors on a double circuit structure carrying a 138kV line (Line X-Y) and a 230kV line (Line A-B) resulted in momentary outages to both lines. The faults occur between phases on the same voltage.

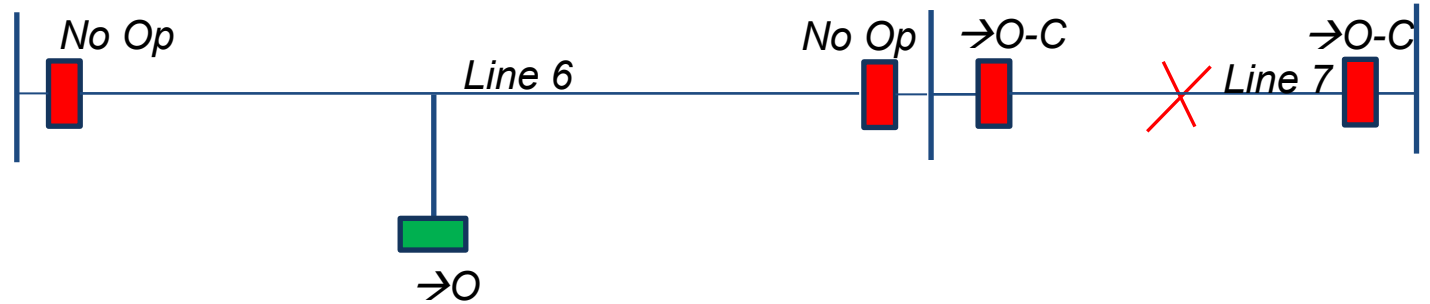
Fields	Form ___ Line A-B	Form ___ Line X-Y	Form 5.0	
Fault Type			Event Type Number	
Outage Initiation Code				
Initiating Cause Code				
Sustained Cause Code				
Outage Mode Code				

Galloping conductors on a double circuit structure carrying a 138kV line (Line X-Y) and a 230kV line (Line A-B) resulted in momentary outages to both lines. The faults occur between phases on the same voltage.

Fields	Form 4.1 Line A-B	Form 4.1 Line X-Y	Form 5.0	
Fault Type	P-P fault	Not reportable	Event Type Number	11
Outage Initiation Code	Element-Initiated	Not reportable		
Initiating Cause Code	Weather	Not reportable		
Sustained Cause Code	NA- Momentary	Not reportable		
Outage Mode Code	Single Mode	Not reportable		

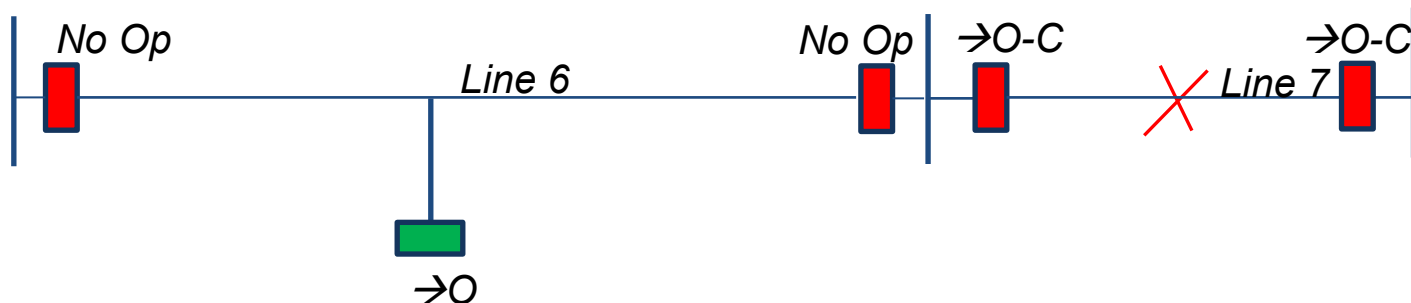
Test Your Knowledge – Example 6

A 138 kV two-terminal transmission line (#7) experiences an outage due to bird contamination which resulted in a single phase to ground fault. The faulted line trips and successfully returns to an in-service state in less than one minute. On an adjacent 138 kV three-terminal line (#6), one remote breaker opens due to failed communication system and failed to return to an in-service state due to a failed reclosing scheme.



Fields	Form ___ Line 6	Form ___ Line 7	Form 5.0	
Fault Type			Event Type Number	
Outage Initiation Code				
Initiating Cause Code				
Sustained Cause Code				
Outage Mode Code				

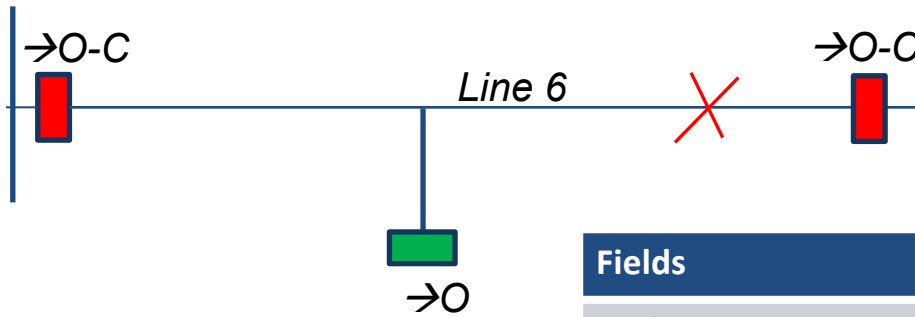
A 138 kV two-terminal transmission line (#7) experiences an outage due to bird contamination which resulted in a single phase to ground fault. The faulted line trips and successfully returns to an in-service state in less than one minute. On an adjacent 138 kV three-terminal line (#6), one remote breaker opens due to failed communication system and failed to return to an in-service state due to a failed reclosing scheme.



Fields	Form 4.1 Line 6	Form 4.1 Line 7	Form 5.0	
Fault Type	No fault	Not reportable	Event Type Number	62
Outage Initiation Code	Protection System-Initiated	Not reportable		
Initiating Cause Code	Failed Protection System Equipment	Not reportable		
Sustained Cause Code	Failed AC Substation Equipment	Not reportable		
Outage Mode Code	Dependent Mode	Not reportable		

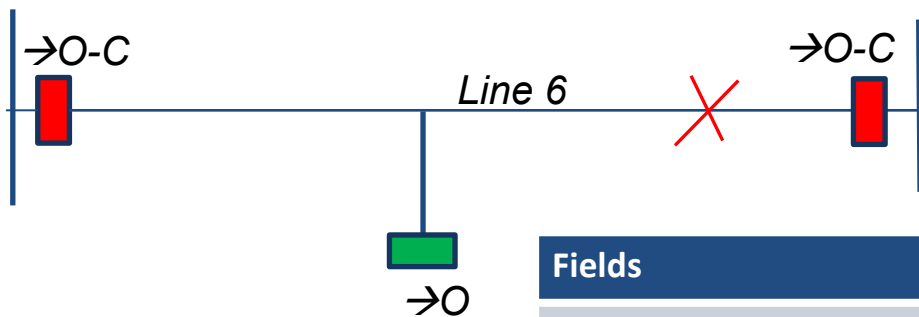
Test Your Knowledge – Example 7

A 138 kV three-terminal line experiences a single phase to ground fault due to lightning. The fault was cleared correctly but one terminal did not close due to a faulty recloser.



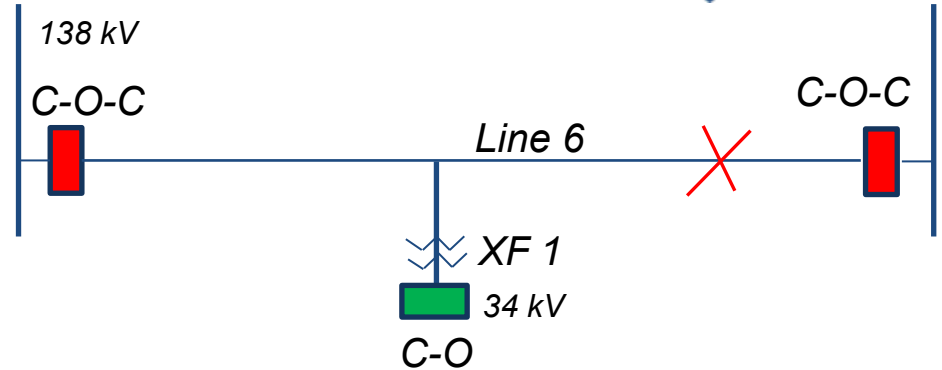
Fields	Form ___ Line 6	Form 5.0	
Fault Type		Event Type Number	
Outage Initiation Code			
Initiating Cause Code			
Sustained Cause Code			
Outage Mode Code			

A 138 kV three-terminal line experiences a single phase to ground fault due to lightning. The fault was cleared correctly but one terminal did not close due to a faulty recloser.



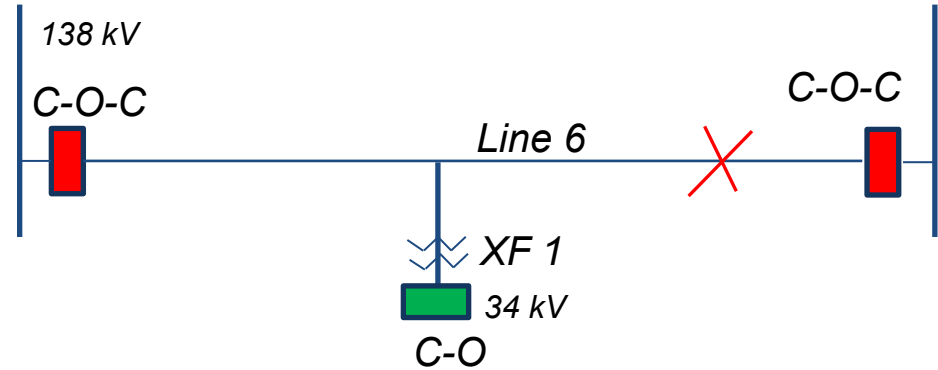
Fields	Form 4.1 Line 6	Form 5.0	
Fault Type	Single P-G fault	Event Type Number	11
Outage Initiation Code	Element-Initiated		
Initiating Cause Code	Lightning		
Sustained Cause Code	Failed AC Substation Equipment		
Outage Mode Code	Single Mode		

A 138 kV three-terminal line experiences a single phase to ground fault due to lightning. The fault was cleared correctly but one terminal did not close due to a faulty recloser.



Fields	Form ___ Line 6	Form ___ XF 1	Form 5.0	
Fault Type			Event Type Number	
Outage Initiation Code				
Initiating Cause Code				
Sustained Cause Code				
Outage Mode Code				

A 138 kV three-terminal line experiences a single phase to ground fault due to lightning. The fault was cleared correctly but one terminal did not close due to a faulty recloser.

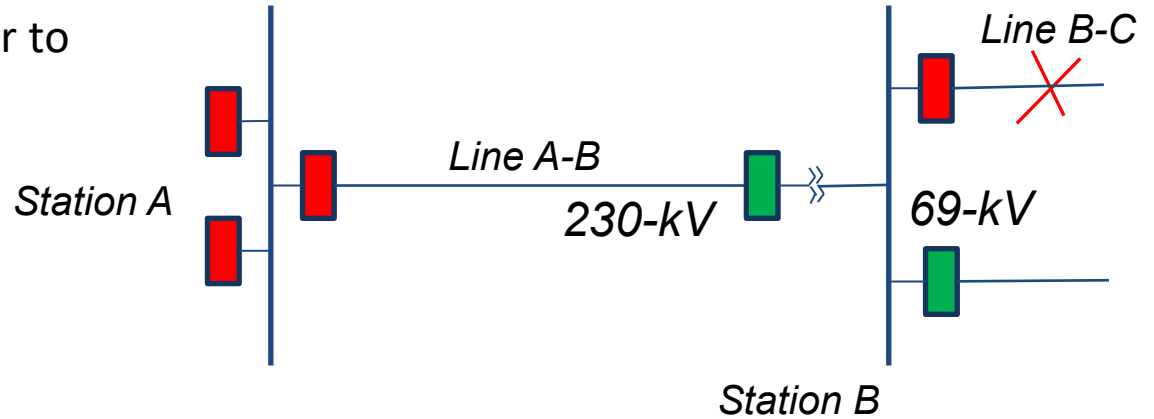


Fields	Form 4.1 Line 6	Form 4.3 XF 1	Form 5.0	
Fault Type	Not reportable	Not reportable	Event Type Number	Not reportable
Outage Initiation Code	Not reportable	Not reportable		
Initiating Cause Code	Not reportable	Not reportable		
Sustained Cause Code	Not reportable	Not reportable		
Outage Mode Code	Not reportable	Not reportable		

Test Your Knowledge – Example 9

A lightning strike occurs on the 69-kV line B-C. The breaker on line B-C fails to open causing the 230kV breaker to open on line A-B.

230 kV Line A-B is a BES Element.
How should this be coded?

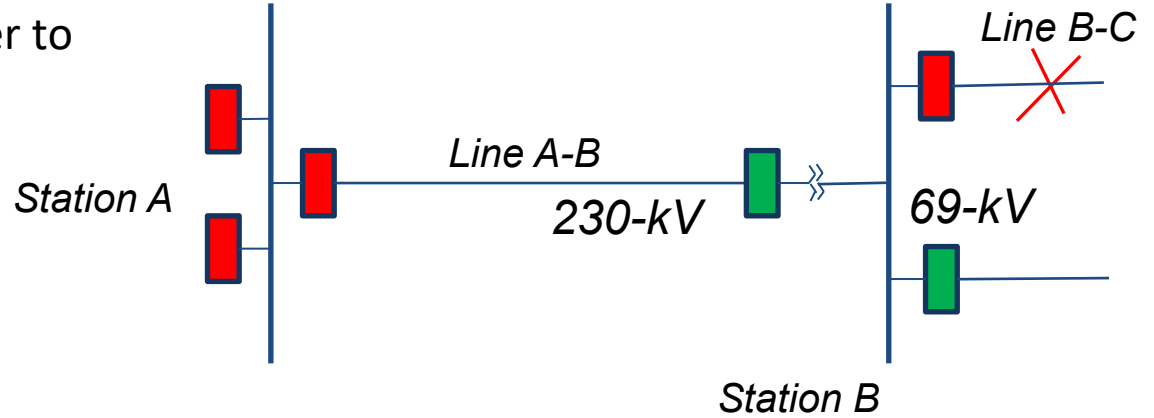


Fields	Form ___ A-B	Form ___ B-C	Form 5.0	
Fault Type			Event Type Number	
Outage Initiation Code				
Initiating Cause Code				
Sustained Cause Code				
Outage Mode Code				

A lightning strike occurs on the 69-kV line B-C. The breaker on line B-C fails to open causing the 230kV breaker to open on line A-B.

230 kV Line A-B is a BES Element.

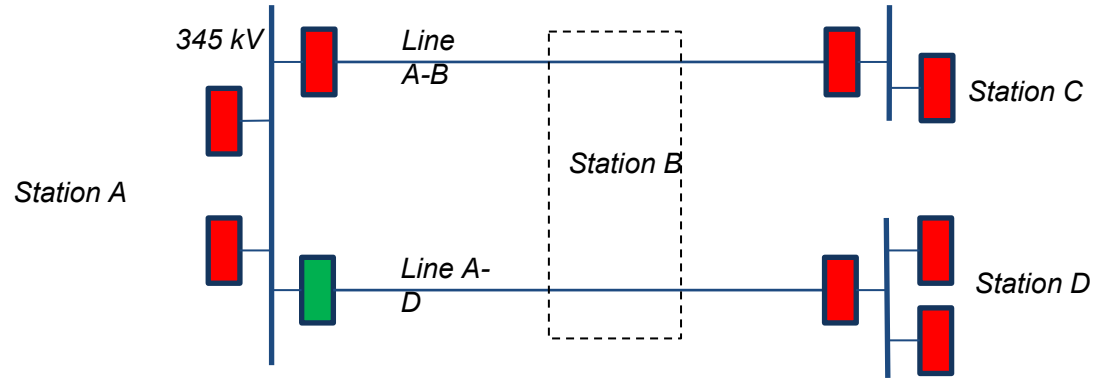
How should this be coded?



Fields	Form 4.1 A-B	Form 4.1 B-C	Form 5.0	
Fault Type	No fault	Not reportable	Event Type Number	60
Outage Initiation Code	AC Substation-Initiated	Not reportable		
Initiating Cause Code	Failed AC Substation Equipment	Not reportable		
Sustained Cause Code	Failed AC Substation Equipment	Not reportable		
Outage Mode Code	Dependent Mode	Not reportable		

Test Your Knowledge – Example 10

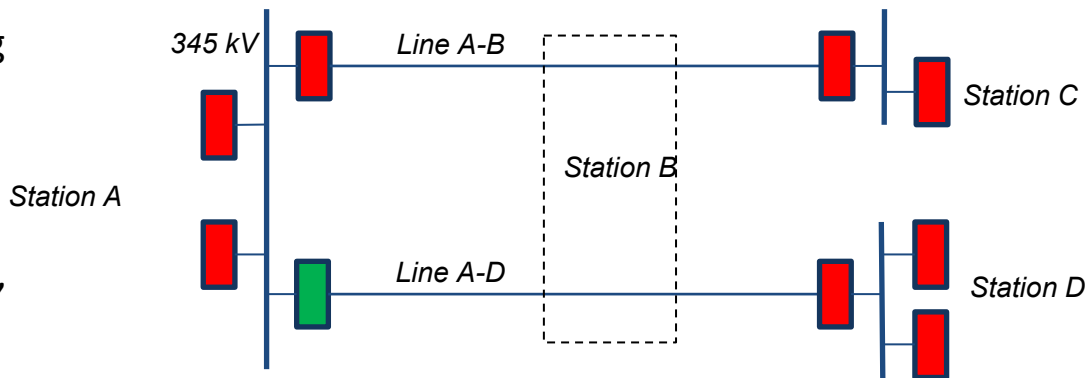
Two circuits exist in parallel both originating from Substation A and running through switching station B, which contains no terminal circuit breakers, before traveling on to two separate remote substations. Whenever a communication link outage of the circuits' protection system occurs one of the parallel lines has to be opened.



How should this be coded?

Fields	Form __ A-D	Form 5.0	
Fault Type		Event Type Number	
Outage Initiation Code			
Initiating Cause Code			
Sustained Cause Code			
Outage Mode Code			

Two circuits exist in parallel both originating from Substation A and running through switching station B, which contains no terminal circuit breakers, before traveling on to two separate remote substations. Whenever a communication link outage of the circuits' protection system occurs one of the parallel lines has to be opened.

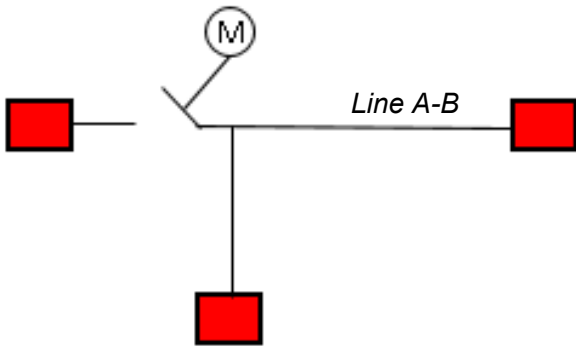


How should this be coded?

Fields	Form 6.1 A-D	Form 5.0	
Fault Type	N/A	Event Type Number	N/A
Outage Initiation Code	N/A		
Initiating Cause Code	Emergency		
Sustained Cause Code	N/A		
Outage Mode Code	N/A		

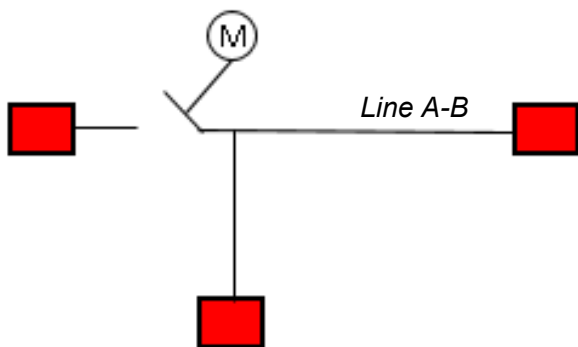
Test Your Knowledge – Example 11

Motor operated disconnect control circuit misoperates and opens the disconnect. For this example, motor operated disconnect is located on the circuit. Breakers do not operate and there is not a BES fault.



Fields	Form ___ Line A-B	Form 5.0	
Fault Type		Event Type Number	
Outage Initiation Code			
Initiating Cause Code			
Sustained Cause Code			
Outage Mode Code			

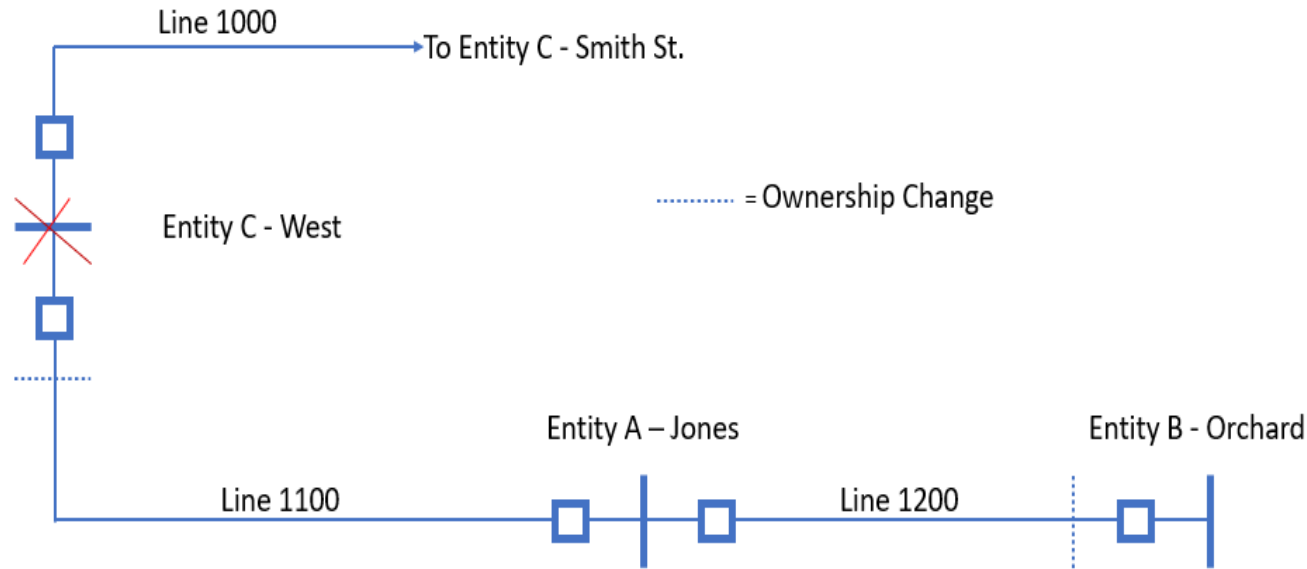
Motor operated disconnect control circuit misoperates and opens the disconnect. For this example, motor operated disconnect is located on the circuit. Breakers do not operate and there is not a BES fault.



Fields	Form 4.1 Line A-B	Form 5.0	
Fault Type	No Fault	Event Type Number	90
Outage Initiation Code	Element-Initiated		
Initiating Cause Code	Failed AC Circuit Equipment		
Sustained Cause Code	Failed AC Circuit Equipment		
Outage Mode Code	Single Mode		

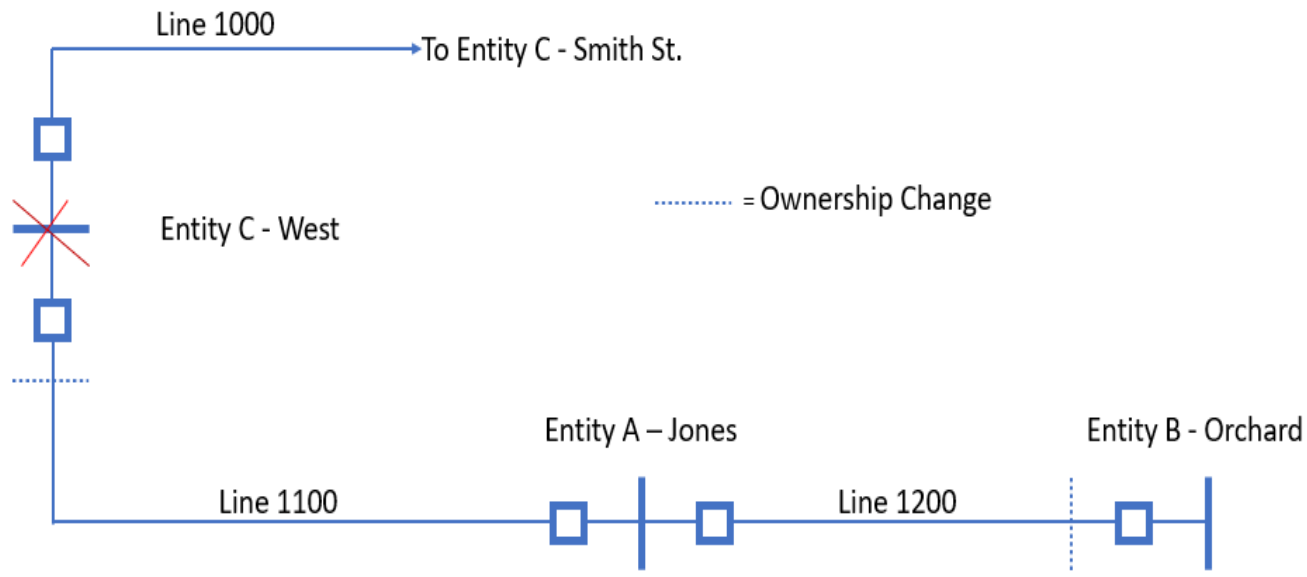
Test Your Knowledge – Example 12

- Fault occurred in Entity C West station due to a potential transformer failure resulting in the Smith St. breaker opening
- At Entity B Orchard, a zone 1 relay was mis-wired causing it to operate for the fault in the reverse direction at West
- This in turn resulted in a single-ended outage to Entity A's 1200 line



Fields	Form ____	Form 5.0	
Fault Type		Event Type Number	
Outage Initiation Code			
Initiating Cause Code			
Sustained Cause Code			
Outage Mode Code			

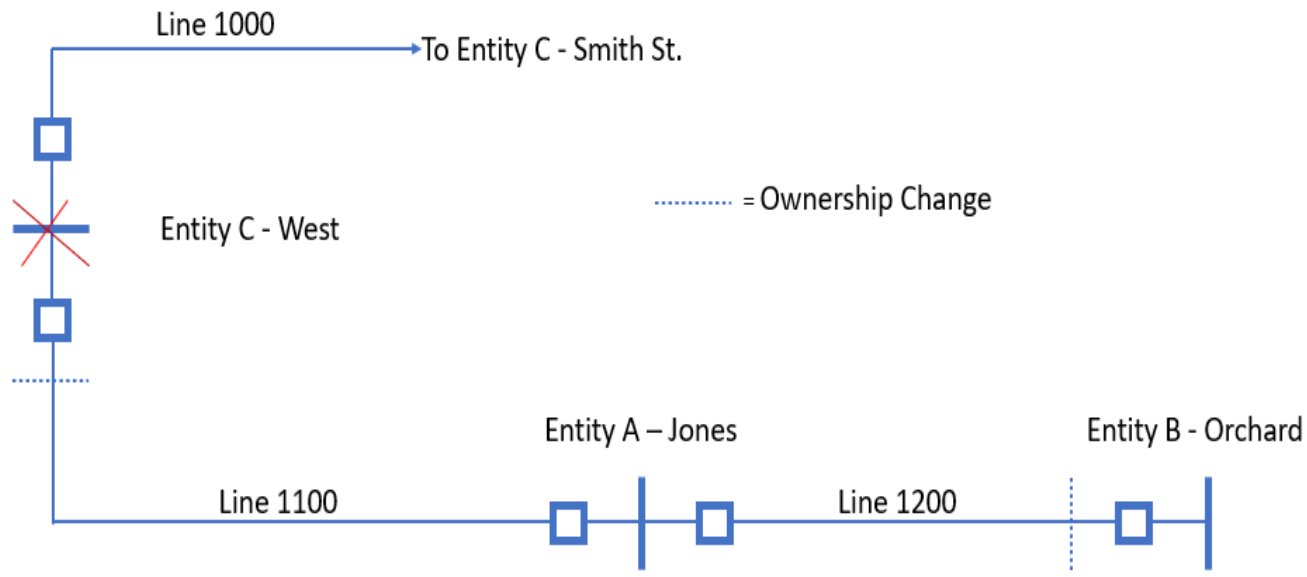
- Fault occurred in Entity C West station due to a potential transformer failure resulting in the Smith St. breaker opening
- At Entity B Orchard, a zone 1 relay was mis-wired causing it to operate for the fault in the reverse direction at West
- This in turn resulted in a single-ended outage to Entity A's 1200 line



Entity C creates NMU Event ID number and reports Line 1000 outage

Fields	Form 4.1	Form 5.0	
Fault Type	Single P-G fault	Event Type Number	05
Outage Initiation Code	AC Substation-Initiated Outage		
Initiating Cause Code	Failed Substation Equipment		
Sustained Cause Code	Failed Substation Equipment		
Outage Mode Code	Dependent Mode Initiating Outage		

- Fault occurred in Entity C West station due to a potential transformer failure resulting in the Smith St. breaker opening
- At Entity B Orchard, a zone 1 relay was mis-wired causing it to operate for the fault in the reverse direction at West
- This in turn resulted in a single-ended outage to Entity A's 1200 line

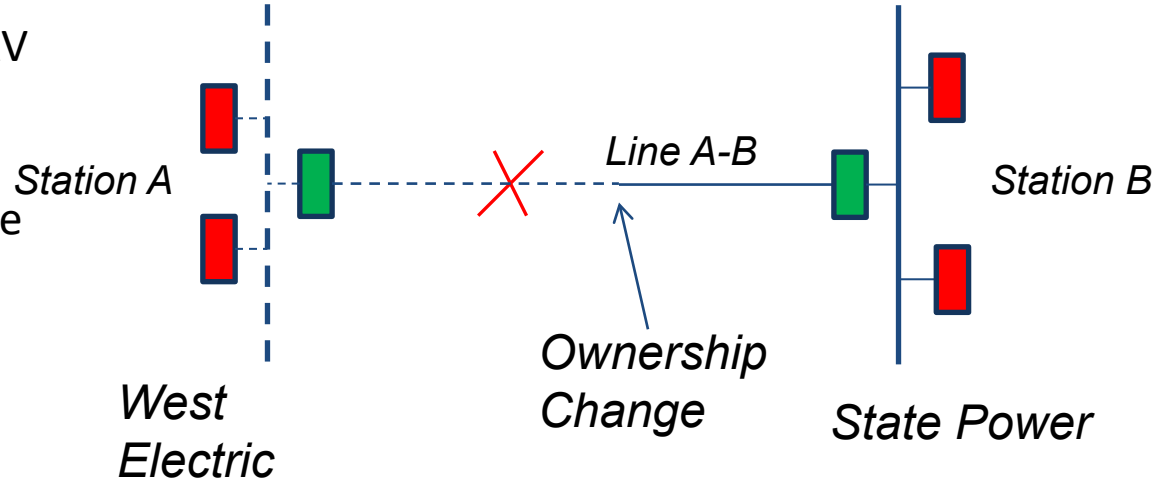


Entity A uses NMU Event ID number created by Entity C and reports Line 1200 outage

Fields	Form 4.1	Form 5.0	
Fault Type	Single P-G Fault	Event Type Number	05
Outage Initiation Code	Protection System-Initiated		
Initiating Cause Code	Failed Protection System Equipment		
Sustained Cause Code	Failed Protection System Equipment		
Outage Mode Code	Dependent Mode		

Test Your Knowledge – Example 13

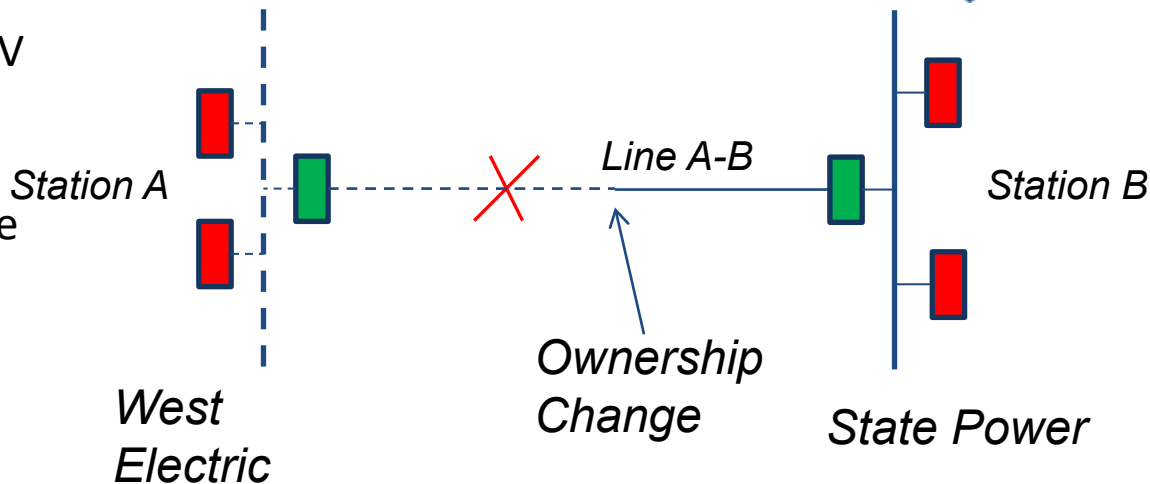
State Power is responsible for reporting outages on the 345 kV Line A-B. A single phase to ground fault occurred on the West Electric section of line due to lightning. Breaker immediately clears fault.



How should this be reported and coded?

Fields	Form ___ A-B	Form 5.0	
Fault Type		Event Type Number	
Outage Initiation Code			
Initiating Cause Code			
Sustained Cause Code			
Outage Mode Code			

State Power is responsible for reporting outages on the 345 kV Line A-B. A single phase to ground fault occurred on the West Electric section of line due to lightning. Breaker immediately clears fault.



How should this be reported and coded?

Fields	Form 4.1 A-B	Form 5.0	
Fault Type	Single P-G fault	Event Type Number	05
Outage Initiation Code	Element-Initiated		
Initiating Cause Code	Lightning		
Sustained Cause Code	N/A - Momentary		
Outage Mode Code	Single Mode Outage		

A stylized map of North America, including the United States, Canada, and Mexico. The map is rendered in shades of blue and grey, with the United States and Canada in a darker blue and Mexico in a lighter grey. The map is centered on the page and partially overlaid by a horizontal blue band.

Questions and Answers

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