NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Transmission Availability Data System (TADS)

DATA REPORTING INSTRUCTION MANUAL

April 4, 2008

USE THIS MANUAL VERSION FOR COMMENTS ON PHASE II TADS

Phase II TADS additions are highlighted in yellow.

to ensure the reliability of the bulk power system

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Version History

Version Date	Major Changes
October 17, 2007	New
November 20, 2007	P. 4. Table 1.5, third row in the "Date" column. Change: December 17, 2007 was changed to January 15, 2008. P.7, Section 2.1. Addition: A new paragraph was added that defines "tie line" for TADS purposes. P. 14. Table 5, Column A. Addition: "For the special first quarter submittal, use "2008" and not "2008Q1." That way the Event ID Codes can be used for the 2008 annual submittal as well." P. 62. AC Circuit that is directly connected to a TADS Transformer. Change: The AC Circuit and Transformer both return to service when both breakers G and H are closed. The exception for a line connected to a transformer described in the definition of In-Service State" in Appendix 6, pp. 3-4 only applies to multi-terminal circuits, not two-terminal circuits. P. 67. Form 4.1. Outage Code D1: This code is associated with the example on p. 62 that was changed. Change: The Outage Duration was changed to 3 minutes from 1 minute Outage ID Codes H2 and H3: Change: The Outage Initiation Code was changed to "Other Facility-Initiated" since the Protection System is not part of an AC Substation. P. 67. Form 4.3. Outage ID Code B2: Changes: The Outage Initiation Code was changed to "Other Element-Initiated" (an AC Circuit) since Transformer did not initiate the reported Transformer outage. Sustained Cause Code changed "Failed AC Equipment" (coding error). Outage ID Code D2: The Outage Initiation Code was changed to "Other Element-Initiated" (an AC Circuit) since Transformer did not initiate the reported Transformer outage. Outage ID Code G: The Fault Type was changed to "None" since there was no fault, just a relay misoperation. The Outage Initiation Code was changed to "Other Facility-Initiated" since the Protection System is not part of the AC Substation.
February 13, 2008	P. 1, Section 1.2.1 We clarified that all voltages are operating voltages. P. 4, Section 1.4.1 We added instructions on how to transmit TADS data securely via e-mail. P. 7, Section 1.9.2 We added new language that emphasizes the need to complete the lower part of Form 1.2 that describes each form's "Submission Status" and "Reason for Not Submitting" forms. This allows us to tell whether a blank form is intended or an oversight. P. 8, Sections 2 and Form 2.1, p. 19 We required that only jointly-owned circuits are to be reported on Form 2.1. We previously required tie lines to be reported even if they were not jointly owned. We eliminated the term "tie line."

February 13, 2008	<u>P. 8, Table 2.1 and p. 19, Form 2.1</u> (i) We added the ability to specify a three-terminal circuit with a new column D. Other columns letters were changed accordingly. (ii) The TO Element Identifier in column I is now required. With this change, it will be possible to produce outage data of jointly owned facilities for all joint owners. (iii) We extended the number of joint owners from four to ten (columns J-W). <u>P. 9, Table 2.2 and p. 20, Form 2.2</u> We added a "Not Applicable" column F to keep the column labeling consistent between Forms 2.1 and 2.2. <u>P. 10, Table 3.1</u> In column B, we clarified that the circuit inventory is not to include circuits which are not normally energized and fully connected to the system or which have not been declared commercially in service by the TO. <u>P. 12, Table 3.2</u> In column B, we clarified that the Transformer inventory is not to include Transformers which are not normally energized and fully connected to the system (e.g., spares) or which have not been declared commercially in service by the TO. <u>Pp. 14-15, Table 4-1-4.4 (Forms 4.1 -4.4) and pp. 26-29, Forms 4.1-4.4</u> (i) The TO Element Identifier in column G is now required. It was previously optional. (ii) The Fault Type drop-down menus in column J were changed to correspond to updated Fault Type descriptions. In addition to being having simpler names, Fault Type 4 now includes three phase faults without a ground target. This type of fault was previously omitted. (iii) The Outage Start Time date heading row label in column L was corrected to "mm/dd/yyyy" from "dd/mm/yyyy." (iv) We also changed the Outage Duration format in column M from "hh:mm" to "hhhh:mm." Note that the format is a text field. Enter 860 hours and 20 min. as 860:20. (v) We added an "Outage Continuation Flag" in column Q which is defined in Appendix 6, Section B. <u>P. 15, Section 4.1</u> We simplified the method for recording outages that continue beyond a reporting year. This section is significantly different. <u>P. 16, Table 5 and p. 29, Form 5</u> The optional description for an Event's outages in column C may be provided for *any* Event ID Code. It was previously restricted to Event ID Codes having an Event Type 50. <u>P, 21, Form 3.1</u> The Voltage Class label for row 11 was corrected to "400-499 kV DC Overhead." <u>P. 23, Form 3.3</u> The Voltage Class for row 4 was corrected to "400-599 kV." <u>Appendix 6 (Definitions), p. 1</u> For "AC Circuit," we clarified that in-line sectionalizing switches inside an AC Substation are part of the AC Circuit. Also clarified that series compensation within an AC Circuit Boundaries is part of the AC Circuit, while series compensation outside of the AC Circuit boundaries is part of the AC Substation. <u>Appendix 6 (Definitions), p. 3</u> For "AC Substation," we clarified that series compensation is part of the AC Substation if it is not within an AC Circuit's boundaries.

February 13, 2008	<u>Appendix 6 (Definitions), p. 4</u> For "Automatic Outage," we removed the phrase "i.e., there is a partial or full loss of continuous power flow through the Element to the system" that is descriptive of an outage. The loss of power flow through an Element does not necessarily result in an outage as long as the Element is energized and fully connected as defined in "In Service State." <u>Appendix 6 (Definitions), pp. 5-7</u> For "In-Service State," we added three additional figures showing outages for an AC Circuit and a Transformer. We also modified the three-terminal "exception" explanation. The exception only applies to Figure 8, not both figures. <u>Appendix 6 (Definitions), p. 8</u> We added a new definition for Outage Continuation Flag. <u>Appendix 6 (Definitions), p. 10</u> We added different description of Fault Type, including clarifying that it applies to each outaged Element. Fault Type 4 now includes three phase faults without a ground target. This type of fault was omitted previously. <u>P. 72, Form 4.3</u> Outage ID Code B2 and D2: Changes: The Fault Type was changed to "No fault" because the Transformer did not experience a fault.
April 4, 2008 (Phase I changes)	<u>All circuit illustrations</u> We consistently color-coded all breakers: "red" breakers are closed and "green" breakers are open. <u>P. 2, Section 1.3</u> In the reference to Appendix 2, we changed the phrase "Forms for Jointly-Owned Facilities" to "Forms for Multiple-Owner Elements." • The term "jointly-owned" imparted a legal connotation that TADS did not intend. As an example, consider an AC Circuit that has a 50% of its length each owned *separately* by two TOs. In cases such as these, the physical change of ownership is usually defined at a designated structure or other landmark. In TADS, this is a multi-owner AC Circuit. Now suppose a different ownership arrangement exists whereby the *entire* circuit is 50% owned by each TO under a joint-ownership agreement. This circuit is also a multi-owner AC Circuit. • When the word "facility" means "Element," it was changed to "Element." *Although similar changes appear elsewhere in the Manual regarding these terms, we do not note each incident in this version history.* <u>P. 3, Section 1.3, item 4</u> We had displayed columns that were not used on forms as grayed out and labeled "NA." These columns are now hidden. This change was required for bulk loading on data into webTADS. <u>P. 4, Section 1.5.1</u> Now that OATI is under contract with NERC for the development of webTADS, we modified this section accordingly. <u>P.11, Table 3.1</u> In column B, we changed the requirement to enter an "NA" into a blank cell. Cells without data should now be left blank. This change was required for bulk loading on data into webTADS. <u>Appendix 7 (Definitions), p.1</u> We stated that the terms "Element" and "TADS Element" have the same meaning.

April 4, 2008 (Phase I changes)	Appendix 7 (Definitions), p.12 The definition of "Dependent Mode Outage" was clarified by removing the inclusion of "Single Mode Outage" in the definition, which had caused confusion. Appendix 9 (Detailed Automatic Outage Data Examples), p. 81 We added a note that described the correct Outage Mode Code had the circuits in the example *not* been on common structures.

Table of Contents

1. Introduction

TADS is described in the *Transmission Availability Data System Revised Final Report* ("Phase I Report") that was approved by the Planning Committee on September 26, 2007. The Phase I Report can be found at http://www.nerc.com/~filez/tadstf.html, and it provides background on how TADS was developed. Phase I collects Automatic Outages.

In addition, a *Transmission Data Availability System Phase II Preliminary Report* dated March 13, 2008 ("Phase II Report") is posted that describes a proposal to collects Non-Automatic Outages.

We developed this *TADS Data Reporting Instruction Manual* ("Manual") to provide TOs with help in completing the data forms for Phase I TADS. This April 4, 2008 version is an update of a prior November 20, 2007 version. There are data forms, most of which have subparts, for each of the Elements for which outage information is reported. This list shows those Elements:

- AC Circuits ≥ 200 kV (Overhead and Underground Circuits). Radial circuits are included.
- DC Circuits with ≥ +/-200 kV DC voltage
- Transformers with ≥ 200 kV low-side voltage
- AC/DC Back-to-Back Converters with ≥ 200 kV AC voltage, both sides

The updated data forms are in a new Excel workbook named "TADS_Master_Data_Forms_03-19-2008," which may be downloaded at http://www.nerc.com/~filez/tadstf.html. This is a special Phase I workbook that can be used to create TADS data files for uploading into webTADS, TADS data entry software described in Section 1.5.1. A second non-operational workbook is posted dated April 4, 2008 and named "TADS Phases I and II Forms for Comment." The workbook has several Phase II worksheets (Form 6.x series) which are part of the Phase II proposal for Non-Automatic Outages. These are not operational at this point; however, they are part of the Phase II comments that are being separately solicited.

1.1 Manual Suggestions

We encourage you to send suggestions for improvements to this Manual to tads@nerc.net. This includes everything from typos to unclear instructions. We will note changes in subsequent updated versions of the Manual.

1.2 TADS Definitions

The TADS Definitions document is a stand-alone document that is in Appendix 7. Most of the terms in the forms have specific definitions which may differ from the common usage of the same term. For example, the term "AC Circuit" is specifically defined and includes both two- and three-terminal circuits. Therefore, it is important that the TO refer to the definitions when completing the forms.

1.2.1. AC and DC Voltage Classes

Appendix 7 defines five Voltage Classes. Voltages are operating voltages. These cover the range of possible AC and DC voltages. For reporting, however, we have defined four AC Voltage Classes by combining two voltage ranges, 400-499 kV and 500-599 kV, into one 400-599 kV class since there are no AC Elements in the 400-499 kV range in North America. However, all five voltage classes are available for DC Elements.

AC Voltage Classes	DC Voltage Classes
200-299 kV	200-299 kV
300-399 kV	300-399 kV
400-599 kV	400-499 kV
600-799 kV	500-599 kV
	600-799 kV

1.3 Forms Overview

The forms and their subparts are in shown in Appendices 1-6. These are depicted as pictures of the worksheets contained in a TADS forms workbook. The workbook can be downloaded at http://www.nerc.com/~filez/tadstf.html. The six form categories are listed below.

Appendix 1: Administrative Forms with Transmission Owner Information

1.1 Non-Reporting Transmission Owner Statement

1.2 Reporting Transmission Owner Information

Appendix 2: Forms for Multiple-Owner Elements

2.1 Multiple-Owner AC and DC Circuits

2.2 Multiple-Owner AC/DC Back-to-Back Converters

Appendix 3: Forms for Element Inventory and Summary Outage Data

3.1 AC and DC Circuit Inventory Data

3.2 Transformer Inventory Data

3.3 AC/DC Back-to-Back Converter Inventory Data

3.4 Summary Automatic Outage Data

Appendix 4: Forms for Detailed Element Automatic Outage Data

4.1 AC Circuit Detailed Automatic Outage Data

4.2 DC Circuit Detailed Automatic Outage Data

4.3 Transformer Detailed Automatic Outage Data

4.4 AC/DC Back-to-Back Converter Detailed Automatic Outage Data

Appendix 5: Form for Event ID Code Data

Appendix 6: Forms for Detailed Element Automatic Outage Data

6.1 AC Circuit Detailed Non-Automatic Outage Data

6.2 DC Circuit Detailed Non-Automatic Outage Data

6.3 Transformer Detailed Non-Automatic Outage Data

6.4 AC/DC Back-to-Back Converter Detailed Non-Automatic Outage Data

Each data form has a common layout.

1. A TO *without a reporting obligation* must submit Form 1.1. On Form 1.2, which is required for a TO *with a reporting obligation*, one portion requests the Transmission Owner's (TO's) name, its NERC ID number, the name of its Regional Entity (RE), its country, and the calendar reporting year. This information is input once on Form 1.2 and linked to subsequent forms. If a TO owns TADS Elements in different regions and/or different countries, it must complete separate TADS submittals to for each region and country.
2. All forms except Forms 4.1-4.4, Form 5, and Forms 6.1-6.4 have row numbers as well as columns with letters (A, B, etc.) The column letters and sometimes the row numbers are used as references in the instructions. With the exception of Forms 3.1-3.4, TOs may add additional rows as needed. If the form has row numbers on it and you add rows, the added rows need to be numbered.
3. Many columns have drop-down menus that correspond to defined choices. For example, all Cause Codes are in a drop-down menu and provide the TO the choice among the *defined* Cause Codes only.
4. To keep the form format and column letter designation the same within a form type, the unused columns are hidden from view. Therefore, column letter designations will not be in sequence when a column has been hidden.

Appendix 8 contains examples to assist the TO in completing Forms 3.1-3.3, which contain inventory data. Appendix 9 contains examples to assist the TO in completing Forms 4.1-4.4, which contain detailed Element Automatic Outage data. Appendix 10 contains examples to assist the TO in completing Forms 6.1-6.4, which contain detailed Element Non-Automatic Outage data.

1.4 Data Confidentiality

Under NERC's confidentiality policy (Section 1500 of NERC's Rules of Procedures), the entity claiming that information is confidential must state the category under which such information qualifies as confidential.

For practicality, we have made judgments that data on certain forms will likely be confidential information because it contains critical energy infrastructure information (CEII), while other information is not confidential. A TO may make its CEII information (per NERC's classification) non-confidential by requesting, in writing, that NERC treat it as such.

CEII is defined by Federal Energy Regulatory Commission (FERC) rules as follows:[1]

(1) *Critical energy infrastructure information* means specific engineering, vulnerability, or detailed design information about proposed or existing critical infrastructure that:

(i) Relates details about the production, generation, transportation, transmission, or distribution of energy;

(ii) Could be useful to a person in planning an attack on critical infrastructure;

(iii) Is exempt from mandatory disclosure under the Freedom of Information Act, 5 U.S.C. 552; and

[1] 18 C.F.R. 388.113(c)(1)-(2)

(iv)Does not simply give the general location of the critical infrastructure.

(2) *Critical infrastructure* means existing and proposed systems and assets, whether physical or virtual, the incapacity or destruction of which would negatively affect security, economic security, public health or safety, or any combination of those matters.

The table below summarizes our judgments on confidential information for each form:

Table 1.4

Form	Default Confidentiality
1.1 Non-Reporting Transmission Owner Statement	Not confidential
1.2 Reporting Transmission Owner Information	Not confidential
2.1 Multi-Owner AC and DC Circuits	Confidential-CEII
2.2 Multi-Owner AC/DC Back-to-Back Converters	Confidential-CEII
3.1 AC and DC Circuit Inventory Data	Not confidential
3.2 Transformer Inventory Data	Not confidential
3.3 AC/DC Back-to-Back Converter Inventory Data	Not confidential
3.4 Summary Outage Data	Confidential-CEII
4.1 AC Circuit Detailed Automatic Outage Data	Confidential-CEII
4.2 DC Circuit Detailed Automatic Outage Data	Confidential-CEII
4.3 Transformer Detailed Automatic Outage Data	Confidential-CEII
4.4 AC/DC Back-to-Back Converter Detailed Automatic Outage Data	Confidential-CEII
5 Event ID Code and Event Type Number Data	Confidential-CEII
6.1 AC Circuit Detailed Non-Automatic Outage Data	Confidential-CEII
6.2 DC Circuit Detailed Non-Automatic Outage Data	Confidential-CEII
6.3 Transformer Detailed Non-Automatic Outage Data	Confidential-CEII
6.4 AC/DC Back-to-Back Converter Detailed Non-Automatic Outage Data	Confidential-CEII

As described in the Phase I Report, regional and NERC annual public performance reports will show *aggregated* confidential information of many TOs. In doing so, no particular TO's data should be identifiable. However, these reports will not inadvertently release confidential information by the display of regional or NERC information from which a TO's confidential information could be ascertained. For example, if the TO in a region is the only owner of assets in a particular Voltage Class, the metrics on that data would not be released if the TO's name and its confidential information could be identified, unless the TO agrees to such a release. If we find that a particular TO's metrics could be identified in a report, we will ask the TO to voluntarily allow us to report its metrics, while keeping other aspects of its data confidential. By "other aspects of its data" we mean other TADS data such the date of an AC Circuit Sustained Outage or the AC Substations that identify the outaged circuit. Those inputs allow an RE or NERC to determine whether outages of different TOs are a single Event. We will address these requests on a case-by-case basis.

1.4.1. Transmitting TADS Data Securely

The TADS data entry software described in Section 1.5.1 will transmit data securely. Until this software is completed, transmittals will be made by e-mail. To securely transmit TADS data securely by e-mail (which contains CEII), the following process should be followed by TOs and REs:

1. Password-protect the document to be transmitted, and send via e-mail to the recipient. Do not include the password in this e-mail.
2. In a second *separate* e-mail, send the password to the recipient of the document.

1.5 2008 (Phase I) Reporting Schedule

Data reporting in 2008 is required for Phase I TADS (Automatic Outages) only. Since the start-up data collection year will be 2008, we developed a timetable that would attempt to catch any fundamental design or implementation issues early rather than wait until year-end. Since data review and processing may take six-months to complete, identifying 2008 problems in mid-2009 would not allow time to correct these problems for the 2009 data submittal. With that in mind, we will follow the timetable in Table 1.5 for 2008 data collection. This timetable includes a two-part submittal of 2008 data with an interim NERC report on first quarter 2008 data. REs will submit a bundled data request to TOs by mid-November of 2007.

Table 1.5

Date	Action
Late October 2007	NERC will ask Regional Entities to request TADS data from Transmission Owners in their region. The reason NERC is going through the regions (as explained in Section 5.3.3 of the Phase I Report), is that regions may elect to request additional data. They will send each TO a bundled data request covering both TADS data and regional-specific data.
Mid-November 2007	Regions will submit their bundled data request to TOs. Certain TADS data is required to be submitted in 2007 to determine which TOs will be not reporting TADS data and, for reporting TOs, who is responsible for reporting outages for multiple-owner Elements. TOs who do not own any TADS assets will be required to submit Form 1.1 to REs. TOs who own TADS assets will be required to submit Form 1.2, and, if applicable, Forms 2.1 and 2.2 that address multiple-owner Elements, to REs.
January 15, 2008	REs ensure that all multi-owner Elements have a single TO with reporting responsibility.
May 30, 2008	TOs submit data to REs for the first quarter ending March 31. This includes inventory data as well as outage data, as well as resubmission of Form1.2, and, if applicable, Forms 2.1, and 2.2.
July 15, 2008	REs submit data to NERC after performing an initial data review.
September 26, 2008	NERC completes an interim report on the results, after performing its data checks.
March 1, 2009	TOs resubmit all 2008 data to REs. (This resubmission will replace the first quarter data submitted by May 30, 2008)
Late June, 2009	NERC completes a final 2008 report on the results, after performing its data checks.

For the special first quarter 2008 submittal, minor changes will be made to adapt the data input form. The reporting year will be “2008Q1.” On forms that use the term “year” or “annual,” those forms will be modified and the word “Q1” will be substituted. The only input data that requires different treatment is the inventory data on Forms 3.1, 3.2, and 3.3 for TOs who either add or remove Elements in the first quarter of 2008. Appendix 8 illustrates how to make this calculation for an annual submittal. For the special first quarter submittal, the same example applies, except the “year” in Appendix 8 is the first quarter in 2008. It contains 91 days or 2,284 hrs.

1.5.1. TADS Data Entry and Analysis Software

REs are the point of contact for TADS data submittals. However, NERC has contracted with Open Access Technology International, Inc. (OATI) to develop a software data system to support several processes, including:

- Data entry
- Data error checking
- Data management
- Data analysis and reporting

The availability of this system may impact the logistics of the data submittal process selected by an RE. The TADS software system (named "webTADS") will be available for receiving TADS data by mid-April 2008. Present data inputs use spreadsheets which we recognize are an inefficient way to gather data. The webTADS system will allow TOs to directly enter their data or have it bulk-loaded from the data in the spreadsheets. To accomplish this, we had to make minor format changes to the spreadsheets.

Bulk-loading is available for most, but not all, of the TADS forms. The table below shows which TADS forms may be bulk-loaded and which must be directly entered into webTADS. Bulk-load capability is provided for forms that we expect to contain large amounts of data.

The access to webTADS will be explained in communications with Transmission Owners, and numerous WebEx's are planned to familiarize TOs with the data submittal logistics. Non-reporting TOs (those who have no TADS Elements) will not have access to webTADS, while reporting TOs, REs, and NERC will have access.[2] Instructions for the use of webTADS will be posted within webTADS itself for access by authorized persons.

While the prescribed data entry process will be left to the REs, two alternatives are available:

a. Most REs are not collecting additional data beyond what TADS is requiring. For these regions, they may allow their TOs to directly input their data into webTADS. By doing so, they will not need to develop a separate data entry system. Through webTADS, REs will have access to the data for TOs within their region so that they can perform data review.

b. Other REs that are collecting additional data may request that the TADS data be submitted to them along with their additional data. Ultimately, they will need to get their region's TADS data into the NERC system.

Table 1.5.1

Form	Bulk-loaded
1.1 Non-Reporting Transmission Owner Statement	No[2]
1.2 Reporting Transmission Owner Information	No
2.1 Multiple-Owner AC and DC Circuits	Yes
2.2 Multiple-Owner AC/DC Back-to-Back Converters	Yes
3.1 AC and DC Circuit Inventory Data	No
3.2 Transformer Inventory Data	No
3.3 AC/DC Back-to-Back Converter Inventory Data	No
3.4 Summary Outage Data	No
4.1 AC Circuit Detailed Automatic Outage Data	Yes
4.2 DC Circuit Detailed Automatic Outage Data	Yes
4.3 Transformer Detailed Automatic Outage Data	Yes

[2] Non-reporting TOs will e-mail contact data to their RE, who will input it into TADS.

Form	Bulk-loaded
4.4 AC/DC Back-to-Back Converter Detailed Automatic Outage Data	Yes
5 Event ID Code and Event Type Number Data	Yes
6.1 AC Circuit Detailed Non-Automatic Outage Data	Yes
6.2 DC Circuit Detailed Non-Automatic Outage Data	Yes
6.3 Transformer Detailed Non-Automatic Outage Data	Yes
6.4 AC/DC Back-to-Back Converter Detailed Non-Automatic Outage Data	Yes

1.6 2009 Reporting Schedule

Assuming that Phase II is approved for implementation by NERC's Board of Trustees at its October 28, 2008 meeting, TADS reporting in 2009 will encompass both Phase I and Phase II outages. Unlike Phase I, Phase II will not have a special first quarter data submission. The schedule for reporting 2009 TADS data is show below.

Table 1.6

Date	Item
Early November 2008	Post on the NERC Web site a complete TADS Data Reporting Instruction Manual and 2009 TADS data forms
November–December 2008	Conduct TADS workshops and Web-based training
Mid–December, 2008	REs reconfirm that all multiple-owner Elements have a single TO with reporting responsibility.
March 1, 2010	TOs submit data to REs for the reporting year of 2009.
Mid–April, 2010	REs submit data to NERC after performing an initial data review.
Late June, 2010	NERC completes a final 2009 report on the results, after performing its data checks.

1.7 TADS Training

Three workshops have been held from November 2007 through February 2008 to familiarize TOs with the Phase I reporting requirements, and the training material is posted at http://www.nerc.com/~filez/tadstf.html. Training on the Phase I webTADS software application will be begin in mid April. Several Web-based training classes will be conducted. Phase II training will be conducted in the November-December 2008 timeframe.

1.8 TADS Help

Assistance in completing the forms is available. The following process will be used:

1. Initial questions should be directed to NERC by writing an e-mail to tads@nerc.net. The question will be answered as soon as possible. Written questions are encouraged so that NERC staff can log questions and responses.
2. Particular questions may require phone support. For phone support, call NERC at (609) 452-8060 and ask the operator for a TADS coordinator. The TADS coordinator will document his/her response to the person asking the question in an e-mail.

This process is intended to ensure consistency in responses to questions, and therefore data consistency.

1.9 NERC IDs

Each Transmission Owner is identified by a NERC ID; however, the duplicate NERC IDs may exist between regions for Transmission Owners who are under common ownership at the parent company level. The name of each Transmission Owner on the NERC Compliance Registry and its NERC ID is available at http://www.nerc.com/~org/. Pseudo NERC IDs have been assigned for various purposes, including allowing for one reporting "pseudo TO" to submit one report for multiple NERC-registered TOs that are owned by a single entity. For example, five NERC-registered Southern Company TOs were given one pseudo NERC ID for a pseudo entity named "Southern Transmission Company." The pseudo NERC IDs are for TADS reporting only. A document entitled *NERC ID Exceptions for TADS* is posted at http://www.nerc.com/~filez/tadstf.html explains the TOs that have been assigned pseudo NERC IDs and why they were assigned. A list of all TADS NERC IDs that includes both the NERC IDs of TOs on the NERC Compliance Registry as well as those with pseudo NERC IDs may be downloaded at http://www.nerc.com/~filez/tadstf.html.

1.10 Administrative Forms with Transmission Owner Information

1.10.1. Form 1.1 Non-Reporting Transmission Owner Statement

Form 1.1 is for TOs who do not own any TADS Elements as of date they submit it. It will be submitted in the November/December time frame of the year prior to the reporting year. If a Transmission Owner owns no TADS Elements as of its submission date, it provides the contact information of the person completing the form on behalf of the TO who is attesting to that fact.

Should the TO add any TADS elements after this date, the TO will need to complete Form 1.2 when it is next required to be submitted. Otherwise, Form 1.1 must be resubmitted again in the November/December time frame of the next reporting year.

1.10.2. Form 1.2 Reporting Transmission Owner Information

Form 1.2 asks for three types of TO information.

1. It requests the business contact information for the primary and back-up TADS contact person for the Transmission Owner.
2. It contains a list to confirm which forms were filed and which forms were not filed. The list has drop-down menus for "Submission Status" and "Reason Not Submitted" for the TO to explain which forms were submitted and if not submitted, why they were not submitted (e.g., TO has none of the Elements reported on the form, the TO had no outages, etc.). This ensures that inadvertent form omissions are corrected prior to submittal. For this reason, Form 1.2 is submitted *twice* during each reporting cycle:[3]
   a. In November/December time frame of the year prior to the reporting year.
   b. At the end of the reporting cycle with all other forms.
3. Finally, it lists the NERC default confidentiality status of TO data on each form.

[3] A third submittal is required in 2008 for the first quarter data.

2. Forms for Multiple-Owner Elements

These forms are used to ensure that *one* TO takes on the TADS reporting responsibility for multiple-owner Elements for all outages, both Automatic and Non-Automatic. If a TO has less than 100% ownership interest in such Elements, each TO must enter this Element on Form 2.1 or 2.2. These multiple entries should be coordinated by the TOs involved. The coordinated entries should indicate which single TO will take reporting responsibility for Forms 3, 4, and 5. This will avoid duplication of outage and inventory reporting, and the other TOs who are multiple owners must be aware that they should not report to TADS on that Element. In addition to the names of all multiple owners, their registered NERC ID (or NERC assigned pseudo ID of the designated reporting representative) is also required to be entered.

If a TO owns 100% of an Element, the reporting responsibility of that Element belongs to the TO. Do not enter the Element on Forms 2.1 or 2.2. For 100% owned AC Circuits, communication among the TOs who own the AC Substations that bound the circuit is expected for the purpose of identifying data related to the cause of outages which the reporting TO must supply.

These forms are submitted *twice* for each reporting cycle: [4]

1. In November/December time frame of the year prior to the reporting year.
2. At the end of the reporting cycle with all other forms.

The second submission reflects any additions to Elements that are covered by these forms.

2.1 Form 2.1 Multiple-Owner AC and DC Circuits

The characteristics of each multiple-owner circuit are input on this form (one circuit per row). As discussed in Section 2, we expect TOs to mutually agree on who should report outage and inventory information (on Forms 3, 4 and 5) of the multiple-owner circuit information for TADS and which other owners should not report. Do not enter circuits that you do not partially own.

Table 2.1

Column	Form 2.1 Descriptor
None	Questions 1 and 2 in the top of the form ask whether there were any additions of multiple-owner circuits during the reporting year and if so, whether those changes were incorporated into the response. These questions apply to the second submittal only, and appropriate "NA" responses are provided as an answer associated with a first submittal.
A	The type of circuit (AC or DC), input from a drop-down menu, describes the main characteristic of the Element.
B	From – Substation or Terminal Name. The alphanumeric code designating one of the Substation Names for an AC Circuit or one of the Terminal Names for a DC Circuit.
C	To – Substation or Terminal Name. The alphanumeric code designating a second Substation Name for an AC Circuit or a second Terminal Name for a DC Circuit.
D	To2 – Substation or Terminal Name. The alphanumeric code designating a third Substation Name for an AC Circuit or a third Terminal Name for a DC Circuit.

[4] A third submittal is required in 2008 for the first quarter data.

Column	Form 2.1 Descriptor
E	The Voltage Class of the Element, input from a drop-down menu. Note that five Voltage Classes are in the drop down menu. The menu selection is presently not interactive with the selection of "AC" or "DC" in column A. However, the database will put AC inputs into one of four AC Voltage Classes as described in Section 1.2.1.
F	Underground or Overhead. This Element characteristic is input from a drop-down menu. See the definition of Overhead and Underground in Appendix 7, Section A.
G-H	The NERC ID number and name of the TO with TADS outage reporting responsibility for the multiple-owner circuit.
I	The reporting TO's Element Identifier. This is required.
J-W	The NERC ID numbers and name of the TOs that have an ownership interest in the Element. Up to ten owner names are provided. One of the TOs must be the TO with TADS reporting responsibility input in columns G-H

2.2 Form 2.2 Multiple-Owner AC/DC Back-to-Back Converter

The characteristics of each multiple-owner AC/DC Back-to-Back Converter are input on this form (one Element per row). This form is *not* to be used for AC/DC Back-to-Back Converters owned 100% by a single TO.

Table 2.2

Column	Form 2.2 Descriptor
None	Questions 1 and 2 in the top of the form ask whether there were any additions of multiple-owner AC/DC BTB Converters during the reporting year and if so, whether those changes were incorporated into the response. These questions apply to the second submittal only, and appropriate "NA" responses are provided as an answer associated with a first submittal.
A	Converter Station Name. The alphanumeric code designating the converters name.
B	HIDDEN
C	The AC Circuit Voltage Class, input from a drop-down menu, on one side of the converter
D	The AC Circuit Voltage Class, input from a drop-down menu, on the other side of the converter
E-F	HIDDEN
G-H	The NERC ID number and name of the TO with TADS reporting responsibility.
I	The reporting TO's Element Identifier. This is required.
J-Q	The NERC ID numbers and names of the TOs that are multiple owners of the Element. Up to four owner names are provided. One of the TOs must be the TO with TADS reporting responsibility input in column G-H.

3. Forms for Element Inventory and Summary Outage Data

3.1 Form 3.1 AC and DC inventory Data

Form 3.1 is a two-part form:

1. The top half of the form has inventory data for AC and DC Circuits ≥ 200 kV.
2. The bottom half contains Multi-Circuit Structure Mile data for AC Circuits only. If a line section contains two or more common structures which form one or more multi-circuit spans, the total span length can be measured and the associated mileage should be reported in the Multi-Circuit Structure Mile data. If multiple circuits are connected to only one common structure, that structure should be ignored for outage and inventory mileage purposes.
3. All DC Circuits are assumed to have two circuits per structure; therefore, for each DC Circuit Voltage Class, the Multi-Circuit Structure Miles is one-half of the total Circuit Miles.

Table 3.1

Column	Form 3.1 Descriptor
None	Questions 1 and 2 ask whether the coordination requested below for **AC Multi-Circuit Structure Miles Inventory Data** has taken place among TOs that report separate circuits on common structures.
A	Rows 1-4: AC Overhead Circuit Data by Voltage Class
A	Rows 5-8: AC Underground Circuit Data by Voltage Class
A	Rows 9-13: DC Overhead Circuit Data by Voltage Class
A	Rows 14-18: DC Underground Circuit Data by Voltage Class
See Appendix 7, Section A, for definitions of "Overhead" and "Underground"	
AC and DC Circuit Inventory Data	
Appendix 8 has an example that illustrates the data requirements for columns B-K for AC and DC Circuits. Appendix 8 illustrates how to make this calculation for an annual submittal. For the special first quarter 2008 submittal, the same example applies, except the "year" in Appendix 8 is the first quarter in 2008. It contains 91 days or 2,284 hrs.	
B	The number of circuits that are installed and "in service" at the end of the reporting year in each Voltage Class which are reported by the TO. **This includes multiple-owner circuits that are reported by the TO.** Do not include circuits which are not normally energized and fully connected to the system or which have not been declared commercially in service by the TO. If you have no circuits in a particular Voltage Class, a blank is the default entry in columns B through K.
C	The number of Circuit Miles associated with the circuits in column B.
D	The number of circuits that were added during the year. These could be new circuits or a circuit that, after reconfiguring, defines a new circuit. For example, if an AC Circuit defined by two breakers that has a tap added with another breaker becomes a three-terminal instead of a two-terminal circuit. The three-terminal circuit is an addition, and the previous two-terminal circuit must be removed. The removed circuit will be contained in column H.
E	The equivalent number of circuits added.
F	The number of Circuit Miles added. These Circuit Miles are associated with the number of circuits in column D.
G	The equivalent number of Circuit Miles added.

Column	Form 3.1 Descriptor
H	The number of circuits that were removed during the year. In the example discussed for column D, the two-terminal circuit that became a three-terminal circuit would be a circuit that is removed and therefore contained in column H. Note: column H is not used in the calculation in column L.
I	The equivalent number of circuits removed.
J	The number of Circuit Miles removed. These Circuit Miles are associated with the number of circuits in column H.
K	The equivalent number of Circuit Miles removed.
L	This is a calculated value for the equivalent annual number of circuits for the reporting year. Note that column H is not used; it is requested as a "sanity check" for column I.
M	This is a calculated value for the equivalent annual number of Circuit Miles for the reporting year. Note that column J is not used; it is requested as a "sanity check" for column K.
AC Multi-Circuit Structure Miles Inventory Data	
Appendix 8 has an example that illustrates the data requirements for columns B-K for Multi-Circuit Structure Miles. 1. Note: Multi-circuit structures that are occupied *by only one circuit* do not contribute to the tabulation of Multi-Circuit Structure Miles. 2. Appendix 8 illustrates how to make this calculation for an annual submittal. For the special first quarter 2008 submittal, the same example applies, except the "year" in Appendix 8 is the first quarter in 2008. It contains 91 days or 2,284 hrs. ***For common structures that carry circuits owned by different TOs, we expect the TOs to coordinate with each other on their reporting of Multi-Circuit Structure Miles so that no double counting takes place. As an example, suppose two circuits owned by different TOs occupy common structures for 10 miles. For this section, the combined number of Multi-Circuit Structure Miles reported by the TOs should not exceed 10. We do not want each TO to report 10 miles since that would double count the miles for the region.***	
A	Rows 19-23 AC multi-circuit structure Voltage Class. Note the "Mixed Voltage" class. This class applies to multi-circuit structures that have two TADS AC Circuits of different voltages (e.g., 230 kV and 345 kV) on the same structure. A structure is not a considered a multi-circuit structure for TADS reporting unless in has two or more AC Circuits, each circuit with a voltage ≥ 200 kV. Therefore, a structure with a 230 kV and a 138 kV AC Circuit does not contribute to the tabulation of Multi-Circuit Structure Miles.
B	NOT APPLICABLE
C	The number of Multi-Circuit Structure Miles in the Voltage Class associated with AC Circuits reported by the TO at the end of the reporting year. **This includes AC Circuits that are multiple-owner circuits that are reported by the TO.** If you have no multi-circuit structures in a particular Voltage Class, a blank is the default entry in columns C, F, G, J, and K.
D-E	NOT APPLICABLE
F	The number of Multi-Circuit Structure Miles added in the Voltage Class associated with AC Circuits reported by the TO.
G	The equivalent number of Multi-Circuit Structure Miles added.
H-I	NOT APPLICABLE
J	The number of Multi-Circuit Structure Miles removed in the Voltage Class associated with AC Circuits reported by the TO.
K	The equivalent number of Multi-Circuit Structure Miles removed.
L	NOT APPLICABLE
M	This is a calculated value for the equivalent annual number of Multi-Circuit Structure Miles for the reporting year. Note that column J is not used; it is requested as a "sanity check" for column K.
N-Q	NOT APPLICABLE

3.2 Form 3.2 Transformer Inventory Data

The inventory data for Transformer is input on this form.

Table 3.2

Column	Form 3.2 Descriptor
A	Rows 1-4: The Voltage Class of the reported Transformers data, based upon all Transformer's high-side voltage. While high-side voltages are reported on this form, each Transformer must have a low-side voltage ≥ 200 kV.
Transformer Inventory Data	
Appendix 8 has an example that illustrates the data requirements for the equivalent number of circuits. The equivalent number of Transformers follows a similar methodology. Appendix 8 illustrates how to make this calculation for an annual submittal. For the special first quarter 2008 submittal, the same example applies, except the "year" in Appendix 8 is the first quarter in 2008. It contains 91 days or 2,284 hrs.	
B	The number of Transformers that are installed and "in service" at the end of the reporting year of in each Voltage Class. Do not include Transformers that are not normally energized and fully connected to the system (e.g., spares) or which have not been declared commercially in service by the TO. If you have no Transformers in a particular Voltage Class, a blank is the default entry in columns B through F.
C	The number of Transformers that were added during the year. If a Transformer merely replaces a "like" Transformer (same high-side and low-side voltages) at the same location, this does not count as an addition or a removal. If the replacement is not a "like" Transformer, an addition should be counted as well as a removal.
D	The equivalent number of Transformers added.
E	The number of Transformers that were removed. If a Transformer merely replaces a "like" Transformer (same high-side and low-side voltages) at the same location, this does not count as an addition or a removal. If the replacement is not a "like" Transformer, an addition should be counted as well as a removal.
F	The equivalent number of Transformers removed.
G	This is a calculated value for the equivalent annual number of Transformers for the reporting year. Note that column E is not used; it is requested as a "sanity check" for column F.

3.3 Form 3.3 AC/DC BTB Converter Inventory Data

The inventory data for AC/DC BTB Converters is input on this form.

Table 3.3

Column	Form 3.3 Descriptor
A	Rows 1-4: The Voltage Class of the reported AC/DC BTB Converters is the highest AC terminal voltage in the AC/DC BTB Converter. This is a phase-to-phase voltage.
AC/DC BTB Converter Inventory Data	
Appendix 8 has an example that illustrates the data requirements for the equivalent number of circuits. The equivalent number of AC/DC BTB Converters follows a similar methodology. Appendix 8 illustrates how to make this calculation for an annual submittal. For the special first quarter 2008 submittal, the same example applies, except the "year" in Appendix 8 is the first quarter in 2008. It contains 91 days or 2,284 hrs.	
B	The number of AC/DC BTB Converters that are installed and "in-service" at the end of the reporting year of in each Voltage Class. **This includes multiple-owner AC/DC BTB Converters that are reported by the TO.** The term "in-service" refers to the accounting state of the AC/DC BTB Converter, not its operational state. If you have no AC/DC BTB Converters in a particular Voltage Class, a blank is the default entry in columns B through F.
C	The number of AC/DC BTB Converters that were added during the year.

Column	Form 3.3 Descriptor
D	The equivalent number of AC/DC BTB Converters added.
E	The number of AC/DC BTB Converters that were removed.
F	The equivalent number of AC/DC BTB Converters removed.
G	This is a calculated value for the equivalent annual number of AC/DC BTB Converters for the reporting year. Note that column E is not used; it is requested as a "sanity check" for column F.

3.4 Form 3.4 Summary Automatic Outage Data

This form contains summary outage data for each of the TADS Elements. Therefore, its description will use the term "Element" to mean a defined TADS Element.

Table 3.4

<table>
<tr><th>Column</th><th>Form 3.4 Descriptor</th></tr>
<tr><td>A</td><td>The Voltage Class of the reported Element. These are the same Voltage Classes used for Elements on the inventory data forms (Forms 3.1, 3.2, and 3.3).</td></tr>
<tr><td>B</td><td>The total number of Sustained Outages for all Elements for the calendar year.</td></tr>
<tr><td>C</td><td>The total number of Momentary Outages for all Elements for the calendar year.</td></tr>
<tr><td colspan="2">Columns B and C are a Self-Checks: These totals in columns B and C can be derived from the detailed Automatic Outage data reported on Form 4.1 (AC Circuits), Form 4.1 (DC Circuits), Form 4.3 (Transformers), and Form 4.4 (AC/DC Back-To-Back Converters).</td></tr>
<tr><td>D</td><td>Number of Elements with zero outages. This number only includes Elements that are in service at the end of the year (or the end of the quarter for special first quarter 2008 submittal) because the percentage calculation in column E is based upon end-of-year (or quarter) inventory. One way to calculate the number of Elements with zero outages is as follows:
1. First find which Elements had one or more outages by using the data of the detailed Automatic Outage data forms (Forms 4.1-4.4). The optional TO Element Identifier would need to been used to identify the Element itself.
2. From the list of Elements developed in step 1 above, subtract the Elements that were removed from service during the year. The result is the number of Elements with one or more outages that were in service at the end of the year.
3. For the final calculation, subtract the result from step 2 from the total number of Elements in service at the end of the year (see column B on the inventory data forms (Forms 3.1, 3.2, or 3.3, as applicable) for this value). The result is the total number of Elements that are in service at the end of the year which had zero outages.</td></tr>
<tr><td>E</td><td>The percentage of Elements with zero outages is a calculated value. It takes the value in D and divides it by the value in column B from the inventory data forms, converting the result into a percentage.</td></tr>
</table>

4. Forms for Detailed Automatic Outage Data

These forms contain data for *each* and *every* Automatic Outage of an Element, both Sustained and Momentary. This form does not have row numbers. Since each line represents an outage and each outage has a unique Outage ID Code, this code is used to identify outage entry.

The first several columns (A-I) contain information that generally describes the Element that was outaged. The single exception is the Event ID Code. The remaining columns (J-P) describe the outage itself. Since there is so much similarity between the columns, all descriptors will be provided once, using the generic term of "Element" instead of AC Circuit, Transformer, etc.

Although we maintain the same "column" letter designations, some columns do not apply to some types of Elements and are therefore "hidden." The hidden columns are listed below."

Form No.	Hidden Columns
4.1	None
4.2	I
4.3	H, I
4.4	H, I

Appendix 9 provides many examples illustrating the completion of the various Form 4 series.

Table 4.1-4.4

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 7, Section B for the definition of Outage ID Code.
B	The Event ID Code associated with the outage. This is assigned by the TO on Form 5. See Appendix 7, Section B for the definition of Event ID Code. The Event ID Code must be appended with the reporting year (e.g., WXY-2008).
C	The Element's Voltage Class. This is consistent to the Voltage Class definitions used for Inventory Data on Forms 3.1-3.3. AC Circuit= phase-to-phase Transformer=high-side voltage DC Circuit= phase-to-return AC/DC BTB Converter= highest AC terminal voltage (phase-to-phase)
D-F	Data that provides a description of the physical location of the Element. AC Circuit= AC Substation Names (3 max) Transformer=AC Substation Name DC Circuit= AC/DC Terminal Names (3 max) AC/DC BTB Converter= Its name
G	The TO Element Identifier is a required alphanumeric field that has the TO's internal identifier of the Element. This could be a circuit or transformer number or other identifier recognized by the TO.
H	This column is only for AC or DC Circuits and identifies whether the outaged Element in an Overhead or Underground Circuit.
I	The AC Multi-Owner Common Structure Flag. This flag only applies to Form 4.1 and is explained on footnote 3 as well as Appendix 7, Section B where the term is fully defined.
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.	
J	The Fault Type (if any) for each circuit Outage, input from a drop-down menu.
K	The Outage Initiation Code, input from a drop-down menu.

Data for Elements That Had an Automatic Outage	
Column	**Forms 4.1-4.4 Descriptor**
L	The Outage Start Time, in Universal Coordinated Time (UTC), ***not*** local time. The use of UTC time will allow related outaged occurring on Elements reported by different Transmission Owners to be linked. See instructions Section 4.1 below for outages that continue beyond the end of the reporting year.
M	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. *If the colon is absent the entry will be interpreted as "hours."* 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.
N	The Initiating Cause Code, input from a drop-down menu. All Momentary Outages must supply this code, and the "Unavailable" Cause Code cannot be used for Momentary Outages. Sustained Outages may use the "Unavailable" code in 2008 only for either the Initiating Cause Code or the Sustained Cause Code, but not both. If the TO has the ability to capture Initiating *and* Sustained Cause Codes, the Unavailable" code is not be used at all. (Note: the spreadsheet drop-down menus do not have this conditional features built in.)
O	The Sustained Cause Code, input from a drop-down menu. This only applies to Sustained Outages. Momentary Outages enter "NA-Momentary."
P	The Outage Mode, input from a drop-down menu.
Q	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 7, Section B where the term is fully defined.

4.1 Outages That Continue Beyond the End of the Year

If an outage begins in a reporting calendar year and continues beyond the end of the year (December 31) or beyond the end of the quarter (March 31) for the special first quarter submittal in 2008, the calculation of a total Outage Duration is not possible. In this case, the following process will be observed.

1. Two separate Outage Durations will be input.
   a. For the reporting year when the outage started, the TO inputs the Outage Start Time and calculates an Outage Duration from the Outage Start Time until the end of the reporting year (or the first quarter for the special first quarter submittal in 2008). The Outage Continuation Flag is input as "1." See Appendix 7, Section B for a complete description of this flag.
   b. For the next reporting year, the *same* Event ID Code and *same* Outage ID Code will be entered for the outage with an Outage Start Time equal to January 1, 00:00 UTC of that reporting year. If the outage is concluded in that reporting year, an Outage Duration is calculated from the Outage Start Time. If the outage continues to the subsequent reporting year, the Outage Duration is entered as 8760:00, or 8784:00 for a leap year. The Outage Continuation Flag is input as "2."
   c. Most outages that are not concluded by the end of a reporting year will conclude in the *next* reporting year. However, an outage may span three or more reporting years. This process described in "b." above continues until the outage ends.

2. For purposes of calculating metrics, the metrics in the first reporting year (or the first quarter if applicable) will reflect the outage in that year (or quarter) for frequency calculations. However, the Outage Duration will be split between reporting years as described above, and any outages with Event ID Codes from the prior year will *not* be counted towards the frequency calculation in the second year.

5. Form for Event ID Code and Event Type Number Data

TO's assign their own Event ID Codes and associated Event Type Numbers. An Event is a transmission incident that results in the Sustained or Momentary Outages of one or more Elements. The table below describes the data collected for the Event ID Code:

Table 5

Column	Form 5 Descriptor
A	The Event ID Code associated with one or more outages. This is assigned by the TO. See Appendix 7, Section B for the definition of Event and Event ID Code. The Event ID Code must be appended with the reporting year (e.g., WXY-2008). For the special first quarter submittal, use "2008" and not "2008Q1." That way the Event ID Codes can be used for the 2008 annual submittal as well.
B	The Event Type No. This is a descriptor of the Event. The table on Form 5 shows the permitted entries, which are in a drop-down menu. • Note that if Event Type No. 10 or 20 is selected, the Outage Mode on Forms 4.1, 4.2, or 4.3 (column P) must be "Single Mode Outage." • Outages of an AC/DC Back-to-Back Converter (Form 4.4) must select Event Type No. 50. Table 5.1 below shows the possible Event Type Numbers based upon several criteria
C	Optional input: Provide a brief description of the Event's outage(s) for any Event ID Code. Please limit the description to 500 characters or less.
D	This field asks whether a disturbance report was filed that was associated with the Event, with different answers contained in a drop-down menu. Year-to-date public (i.e., non-confidential) data of all disturbance report filings are located at http://www.nerc.com/~filez/dawg-disturbancereports.html.

Table 5.1

Element	Outage Mode	# of Element Outages with same Event ID	Normal Clearing?	Common Structure?	= Event Type No.
AC Circuit or Transformer	***Single***	***1 TADS Element***	***Yes***	N/A	***10***
DC Circuit	***Single***	***1 TADS Element***	***Yes***	N/A	***20***
AC Circuit	Any Other than Single	***2 TADS Elements***	***Yes***	***Yes****	***possible 30*****
DC Circuit	Any Other than Single	***2 TADS Elements***	***Yes***	***Yes****	***possible 40*****
AC Circuit or Transformer	***Any Mode***	>= 1 TADS Element	***No***	N/A	***50***
DC Circuit	***Any Mode***	>= 1 TADS Element	***No***	N/A	***50***
AC Circuit or Transformer	Any Other than Single	***2 TADS Elements***	***Yes***	***No****	***50***
DC Circuit	Any Other than Single	***2 TADS Elements***	***Yes***	***No****	***50***
AC Circuit	Any Other than Single	***2 TADS Elements***	***Yes***	***Yes****	***possible 50*****
DC Circuit	Any Other than Single	***2 TADS Elements***	***Yes***	***Yes****	***possible 50*****
AC Circuit, Transformer	Any Other than Single	***>2 TADS Elements***	N/A	N/A	***50***
DC Circuit	Any Other than Single	***>2 TADS Elements***	N/A	N/A	***50***
AC/DC Back-to-Back Converter	**Any Mode**	>= 1 TADS Element	N/A	N/A	**50**
Notes:	* Yes = two or more common structures.		No = one or zero common structures.		
	** TO to determine based on available information.				

Please comment on this entire Section 6

6. Forms for Detailed Non-Automatic Outage Data

These forms contain data for *each* and *every* Non-Automatic Outage of an Element, both Planned and Operational. This form does not have row numbers. Since each line represents an outage and each outage has a unique Outage ID Code, this code is used to identify outage entry.

Although we maintain the same "column" letter designations, some columns do not apply to some types of Elements and are therefore "hidden." The hidden columns are listed below.

Form No.	Hidden Columns
6.1	B, I, J, P
6.2	B, I, J, P
6.3	B, E, F, H, I, J, P
6.4	B, E, F, H, I, J, P

Table 6.1-6.4

Data for Elements That Had a Non-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 7, Section B for the definition of Event ID Code.
B	HIDDEN
C	The Element's Voltage Class. This is consistent to the Voltage Class definitions used for Inventory Data on Forms 3.1-3.3. AC Circuit= phase-to-phase Transformer=high-side voltage DC Circuit= phase-to-return AC/DC BTB Converter= highest AC terminal voltage (phase-to-phase)
D-F	Data that provides a description of the physical location of the Element. AC Circuit= AC Substation Names (3 max) Transformer=AC Substation Name DC Circuit= AC/DC Terminal Names (3 max) AC/DC BTB Converter= Its name
G	The TO Element Identifier is a required alphanumeric field that has the TO's internal identifier of the Element. This could be a circuit or transformer number or other identifier recognized by the TO.
H	This column is only for AC or DC Circuits and identifies whether the outaged Element in an Overhead or Underground Circuit.
I	HIDDEN
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.	
J	HIDDEN
K	The Non-Automatic Outage type, Planned or Operational, input from a drop-down menu.
L	The Outage Start Time, in Universal Coordinated Time (UTC), ***not*** local time. The use of UTC time will allow related outaged occurring on Elements reported by different Transmission Owners to be linked. See instructions Section 6.1 below for outages that continue beyond the end of the reporting year.

Please comment on this entire Section 6

Data for Elements That Had a Non-Automatic Outage	
Column	**Forms 6.1-6.4 Descriptor**
M	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 6.1 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. *If the colon is absent the entry will be interpreted as "hours."* 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.
N	For Planned Outages, the Planned Outage Cause Code, input from a drop-down menu. If the outage type selected in column K was an Operational Outage, select "NA" for this entry.
O	For Operational Outages, the Operational Outage Cause Code, input from a drop-down menu. If the outage type selected in column K was an Planned Outage, select "NA" for this entry
P	HIDDEN
Q	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 7, Section B where the term is fully defined.

6.1 Outages That Continue Beyond the End of the Year

If an outage begins in a reporting calendar year and continues beyond the end of the year (December 31), the calculation of a total Outage Duration is not possible. In this case, the following process will be observed.

1. Two separate Outage Durations will be input.
    a. For the reporting year when the outage started, the TO inputs the Outage Start Time and calculates an Outage Duration from the Outage Start Time until the end of the reporting year. The Outage Continuation Flag is input as "1." See Appendix 7, Section B for a complete description of this flag.
    b. For the next reporting year, the *same* Outage ID Code will be entered for the outage with an Outage Start Time equal to January 1, 00:00 UTC of that reporting year. If the outage is concluded in that reporting year, an Outage Duration is calculated from the Outage Start Time. If the outage continues to the subsequent reporting year, the Outage Duration is entered as 8760:00, or 8784:00 for a leap year. The Outage Continuation Flag is input as "2."
    c. Most outages that are not concluded by the end of a reporting year will conclude in the *next* reporting year. However, an outage may span three or more reporting years. This process described in "b." above continues until the outage ends.
2. For purposes of calculating metrics, the metrics in the first reporting year will reflect the outage in that year for frequency calculations. However, the Outage Duration will be split between reporting years as described above, and any outages from the prior year will *not* be counted towards the frequency calculation in the second year.

Appendix 1 Administrative Forms with Transmission Owner Information

1.1. Non-Reporting Transmission Owner Statement

Form 1.1 Non-Reporting Transmission Owner Statement		
	Data is not Confidential	
Row No.	NERC ID	
1	Transmission Owner Name:	
2	Regional Entity Name:	
3	Country:	
4	Reporting Year:	
5		
6	As of date below, the Transmission Owner named above affirms that it	
7	**does not** own any transmission assets as defined below:	
8	**1. AC Circuits ≥ 200 kV (Overhead and Underground)**	
9	**2. Transformers with ≥ 200 kV low-side voltage**	
10	**3. AC/DC Back-to-Back Converters with ≥ 200 kV AC voltage, both sides**	
11	**4. DC Circuits with ≥ +/-200 kV DC voltage**	
12		
13	The definitions of the terms used above are provided in the NERC TADS	
14	*Data Reporting Instruction Manual* posted at	
15	http://www.nerc.com/~filez/tadstf.html.	
16		
17	On behalf of the Transmission Owner named above, this statement is submitted by:	
18	Name	
19	Title	
20	Company	
21	Mailing Address	
22		
23		
24		
25	E-mail address	
26	Telephone (office)	
27	Telephone (mobile)	
28	Date	

1.2. Reporting Transmission Owner Information

Row No.	Form 1.2 Reporting Transmission Owner Information				
	Data is not Confidential		The TO acknowledges that it owns or will report on one or more Elements as defined below		
Row No.	NERC ID		1. AC Circuits ≥ 200 kV (Overhead and Underground)		
1	Transmission Owner Name:		2. Transformers with ≥ 200 kV low-side voltage		
2	Regional Entity Name:		3. AC/DC Back-to-Back Converters with ≥ 200 kV AC voltage, both sides		
3	Country:		4. DC Circuits with ≥ +/-200 kV DC voltage		
4	Reporting Year:				
5					
6	TO Contacts:				
7	Name		Primary:		
8	Title				
9	Mailing Address				
10					
11					
12	E-mail address				
13	Telephone (office)				
14	Telephone (mobile)				
15					
16	Name		Secondary:		
17	Title				
18	Mailing Address				
19					
20					
21	E-mail address				
22	Telephone (office)				
23	Telephone (mobile)				

TADS Application Checklist					
Form No.	**Short Form Name**	**Submission Status**	**Reason Not Submitted**	**NERC Default Confidentiality Status***	**Exportable**
1.1	TO TADS Statement	Not Submitted	**Must be submitted if Non-Reporting**	Contact Data - Data is **not** Confidential.	No
1.2	TO Contacts:	Submitted	**Must be submitted**	Contact Data - Data is **not** Confidential.	No
2.1	Joint AC/DC Ckts	Submitted	NA; form was submitted	Confidential - Critical Energy Infastructure Information	Yes
2.2	Joint AC/DC BTB Converters	Not Submitted	No data of this type	Confidential - Critical Energy Infastructure Information	Yes
3.1	AC/DC Ckt. Inven.	Submitted	NA; form was submitted	Data is **not** Confidential.	No
3.2	Transformer Inven.	Submitted	NA; form was submitted	Data is **not** Confidential.	No
3.3	AC/DC BTB Con. Inven.	Not Submitted	No Elements of this type	Data is **not** Confidential.	No
3.4	Summary Auto. Outage Data	Submitted	NA; form was submitted	Confidential - Critical Energy Infastructure Information	No
4.1	AC Circuit Outages	Submitted	NA; form was submitted	Confidential - Critical Energy Infastructure Information	Yes
4.2	DC Circuit Outages	Not Submitted	No Elements of this type	Confidential - Critical Energy Infastructure Information	Yes
4.3	Transformer Outages	Not Submitted	No Outages	Confidential - Critical Energy Infastructure Information	Yes
4.4	AC/DC BTB Con.Outages	Not Submitted	No Elements of this type	Confidential - Critical Energy Infastructure Information	Yes
5.0	Event ID Codes	Submitted	NA; form was submitted	Confidential - Critical Energy Infastructure Information	Yes

Appendix 2 Forms for Multiple-Owner Elements

2.1. Multiple-Owner AC and DC Circuits

Form 2.1 Multi-Owner AC and DC Circuits							CONFIDENTIAL INFORMATION		
1. Were multi-owner AC and DC Circuits added during the reporting year?					NA - 1st submittal				
2. If the answer to the question above is "yes," does this Form 2.1 reflect the additions?					NA				
Notes:									
[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.									
[2] The fraction of the reporting period that the circuit is in-service. 1.0 = in-service for entire reporting period.									
This form lists all the AC and DC Circuits that are have mutpile owners and which are ≥ 200 kV. One TO must assume reporting responsibility, and that TO must be indentified in columns H and I.									
To ensure that outage data on these Elements are reported, the TO must list each multiple-owner circuit, the mulitple owners and the TO that is reporting outage data on the circuit.									
		Substation/Terminal Name							
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Row No.	Type of Circuit (AC or DC)	From	To	To2	Voltage Class	Overhead or Underground	Reporting TO's NERC ID	Reporting TO's Name	Reporting TO's Element Identifier
1									

Continued…

Names of All Transmission Owners (occurs up to 10x)							
(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
TO#1 NERC ID	TO#1 Name	TO#2 NERC ID	TO#2 Name	TO#3 NERC ID	TO#3 Name	TO#4 NERC ID	TO#4 Name

. . .

2.2. Multiple-Owner AC/DC Back-to-Back Converters

Form 2.2 Mutiple-Owner AC/DC BTB Converters

CONFIDENTIAL INFORMATION

1. Were multiple-owner AC/DC Back-to-Back Converters added during the reporting year?	NA - 1st submittal
2. If the answer to the question above is "yes," does this Form 2.2 reflect the additions?	NA

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.

[2] Columns B, E, and F are hidden because they contain no data for this form.

This form lists all the AC/DC Back-to-Back Converters that have multiple owners and which are ≥ 200 kV AC on both sides. One TO must assume reporting responsibility, and that TO must be indentified in columns G and H.

To ensure that outage data on these Elements are reported, the TO must list each multiple-owner converter, the multiple owners and the TO that is reporting outage data on the converter.

		AC Circuit Voltage Class					Names of Joint Transmission Owners					
	(A)	(C)	(D)	(G)	(H)	(I)	(J)		(K)	(L)		(M)
Row No.	Name of AC/DC Back-to-Back Converter Station	on one side	on second side	Reporting TO's NERC ID	Reporting TO's Name	Reporting TO's Element Identifier	TO#1	NERC ID	TO#1 Name	TO#2	NERC ID	TO#2 Name
1												

Continued…

Names of Joint Transmission Owners					
(N)		(O)	(P)		(Q)
TO#3	NERC ID	TO#3 Name	TO#4	NERC ID	TO#4 Name

Appendix 3 Forms for Element Inventory and Summary Outage Data

3.1. AC and DC Circuit Inventory Data

Form 3.1 AC and DC Circuit Inventory Data — Data is not Confidential

Transmission Owner Coordination Questions		Answers
	1. Do any of the Multi-Circuit Structure Miles contain circuits on the common structures that are reported by you and another Transmission Owner(s)?	No
	2. If the answer to question 1 is "yes," have you and the other Transmission Owner(s) coordinated your reporting to insure that no double counting of Multi-Circuit Structure Miles are being reported for the circuits on these structures?	Not applicable

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.

[2] AC Circuit Voltages are phase-to-phase. DC Circuit Voltages are phase-to-return.

[3] See examples in the TADS Data Reporting Instruction Manual.

[4] Mixed TADS voltages (e.g., 230 kV and 345 kV) on common structures.

AC and DC Circuit Inventory Data

Row No.	(A) Voltage Class [2]	(B) No. of Circuits (End-of-Year)	(C) Circuit Miles (End-of-Year)	(D) No. of Circuits Added	(E) Equivalent Annual No. of Circuits Added [3]	(F) No. of Circuit Miles for Circuits Added	(G) Equivalent Annual No. of Circuit Miles for Circuits Added [3]	(H) No. of Circuits Removed	(I) Equivalent Annual No. of Circuits Removed [3]	(J) No. of Circuit Miles for Circuits Removed	(K) Equivalent Annual No. of Circuit Miles for Circuits Removed [3]	(L) CALCULATED Annual Equivalent No. of Circuits = B-D+E+I	(M) CALCULATED Annual Equivalent No. of Circuit Miles = C-F+G+K
1	200-299 kV AC Overhead												
2	300-399 kV AC Overhead												
3	400-599 kV AC Overhead												
4	600-799 kV AC Overhead												
5	200-299 kV AC Underground												
6	300-399 kV AC Underground												
7	400-599 kV AC Underground												
8	600-799 kV AC Underground												
9	200-299 kV DC Overhead												
10	300-399 kV DC Overhead												
11	400-499 kV DC Overhead												
12	500-599 kV DC Overhead												
13	600-799 kV DC Overhead												
14	200-299 kV DC Underground												
15	300-399 kV DC Underground												
16	400-499 kV DC Underground												
17	500-599 kV DC Underground												
18	600-799 kV DC Underground												

AC Muliti-Circuit Structure Miles Inventory Data

Row No.	(A) Voltage Class [2]	(B)	(C) Multi-Circuit Structure Miles (End-of-Year)	(D)	(E)	(F) No. of Multi-Circuit Structure Miles for Circuits Added	(G) Equivalent Annual No. of Multi-Circuit Structure Miles for Cicuits Added [3]	(H)	(I)	(J) No. of Multi-Circuit Structure Miles for Circuits Removed	(K) Equivalent Annual No. of Multi-Circuit Structure Miles for Circuits Removed [3]	(L)	(M) CALCULATED Annual Equivalent No. of Multi-Circuit Structure Miles = C-F+G+K
19	200-299 kV AC												
20	300-399 kV AC												
21	400-599 kV AC												
22	600-799 kV AC												
23	Mixed Voltages [4]												

3.2. Transformer Inventory Data

Form 3.2 Transformer Inventory Data — **Data is not Confidential**

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.

[2] Report high-side phase-to-phase voltage. However, to be reported on this Form 3.2, the Transformer must have a low-side voltage that is ≥ 200 kV.

[3] Only report transformers that are "in-service." Do not include spares.

[4] See example in the Data Reporting Instruction Manual.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Row No.	AC Voltage Class [2]	No. of Transformers (End-of-Year) [3]	No. of Transformers Added	Equivalent Annual No. of Transformers Added [4]	No. of Transformers Removed	Equivalent Annual No. of Transformers Removed [4]	CALCULATED Annual Equivalent No. of Transformers = B-C+D+F
1	200-299 kV						
2	300-399 kV						
3	400-599 kV						
4	600-799 kV						

3.3. AC/DC Back-to-Back Converter Inventory Data

Form 3.3 AC/DC BTB Converter Inventory Data					Data is not Confidential		
Notes:							
[1]	If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.						
[2]	Report the highest terminal AC voltage (phase-to-phase).						
[3]	See example in the Data Reporting Instruction Manual.						
	(A)	**(B)**	**(C)**	**(D)**	**(E)**	**(F)**	**(G)**
Row No.	**Voltage Class [2]**	**No. of Converters (End-of-Year)**	**No. of Converters Added**	**Equivalent Annual No. of Converters Added [3]**	**No. of Converters Removed**	**Equivalent Annual No. of Converters Removed [3]**	**CALCULATED Annual Equivalent No. of Converters = B-C+D+F**
1	200-299 kV						
2	300-399 kV						
3	400-599 kV						
4	600-799 kV						

3.4. Summary Automatic Outage Data

Form 3.4 Summary Automatic Outage Data — CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.

[2] AC Circuit Voltages are phase-to-phase. DC Circuit Voltages are phase-to-return.

[3] Only consider circuits with zero outages that are "in-service" at the end of the year.

[4] Report high-side phase-to-phase voltage. However, to be reported, the Transformer must have a low-side voltage that is ≥ 200 kV.

[5] Only consider transformers with zero outages that are "in-service" at the end of the year. Do not includes spares.

[6] Report the highest terminal AC voltage (phase-to-phase).

[7] Only consider converters with zero outages that are "in-service" at the end of the year.

AC & DC Circuit Automatic Outage Data

Row No.	(A) Voltage Class [2]	(B) No. of Sustained Outages	(C) No. of Momentary Outages	(D) No. of Circuits with Zero Automatic Outages [3]	(E) Calculated Percentage Circuits with Zero Automatic Outages expressed as %
1	200-299 kV AC Overhead				
2	300-399 kV AC Overhead				
3	400-599 kV AC Overhead				
4	600-799 kV AC Overhead				
5	200-299 kV AC Underground				
6	300-399 kV AC Underground				
7	400-599 kV AC Underground				
8	600-799 kV AC Underground				
9	200-299 kV DC Overhead				
10	300-399 kV DC Overhead				
11	400-499 kV DC Overhead				
12	500-599 kV DC Overhead				
13	600-799 kV DC Overhead				
14	200-299 kV DC Underground				
15	300-399 kV DC Underground				
16	400-499 kV DC Underground				
17	500-599 kV DC Underground				
18	600-799 kV DC Underground				

Continued on next page …

3.4. Summary Automatic Outage Data (continued)

Form 3.4 Summary Automatic Outage Data — CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.
[2] AC Circuit Voltages are phase-to-phase. DC Circuit Voltages are phase-to-return.
[3] Only consider circuits with zero outages that are "in-service" at the end of the year.
[4] Report high-side phase-to-phase voltage. However, to be reported, the Transformer must have a low-side voltage that is ≥ 200 kV.
[5] Only consider transformers with zero outages that are "in-service" at the end of the year. Do not includes spares.
[6] Report the highest terminal AC voltage (phase-to-phase).
[7] Only consider converters with zero outages that are "in-service" at the end of the year.

Transformer Automatic Outage Data

	(A)	(B)	(C)	(D)	(E)
		No. of Sustained Outages	No. of Momentary Outages	Number of Transformers with Zero Automatic Outages [5]	Calculated Percentage (%) Transformers with Zero Automatic Outages expressed as %
Row No.	**Voltage Class [4]**				
19	200-299 kV				
20	300-399 kV				
21	400-599 kV				
22	600-799 kV				

AC/DC Back-to-Back Converters Automatic Outage Data

	(A)	(B)	(C)	(D)	(E)
		No. of Sustained Outages	No. of Momentary Outages	Number of Converters with Zero Automatic Outages [7]	Calculated Percentage (%) AC/DC Back-to-Back Converters with with Zero Automatic Outages expressed as %
Row No.	**Voltage Class [6]**				
23	200-299 kV				
24	300-399 kV				
25	400-599 kV				
26	600-799 kV				

Appendix 4 Forms for Detailed Automatic Outage Data

4.1. AC Circuit Detailed Automatic Outage Data

Form 4.1 AC Circuit Automatic Outages — CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.
[2] The Event ID Code is defined on Form 5. If the outage is carried over from a previous year, use the Event ID Code for the original outage.
[3] 0 = Not applicable (Circuit is not on common structures with another circuit, or the circuit is on common structures, but all circuits are reported by the reporting Transmission Owner.
1 = Circuit is on common structures with another circuit that is being reported by another Transmission Owner.
[4] For outages which started in another (previous) reporting year, enter 01/01/yyyy 00:00 as the Outage Start Time, where yyyy is the current reporting year.
[5] Report zero hours and zero minutes Outage Duration for Momentary Outages. For outages that started in a previous reporting year, enter the Outage Duration for the current reporting year only.
[6] For Momentary Outages, do not us the "Unavailable" Cause Code. For Sustained Outages, the "Unavailable" Cause Code may be used for either Initiating Outage Code or the Sustained Outage Code, but not both.
[7] For Momentary Outages, enter "NA-Momentary"
[8] 0 = Outage began and ended within the reporting year; 1= Outage began in the reporting year but continues into the next reporting year; 2 = Outage started in another (previous) reporting year.

AC Circuit Momentary and Sustained Outage Data

			Circuit Substation Boundaries					
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Outage ID Code	Event ID Code [2]	Voltage Class	AC Substation Name #1	AC Substation Name #2	AC Substation Name #3	TO Element Identifier (AC Circuit)	OH or UG?	AC Multi-Owner Com. Struct. Flag [3]

Continued…

AC Circuit Momentary and Sustained Outage Data

				Cause Codes			
(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
Fault Type	Outage Initiation Code	Start Time (mm/dd/yyyy hh:mm) (UTC) [4]	Outage Duration hhhh:mm [5]	Initiating Cause Code [6]	Sustained Cause Code [7]	Outage Mode	Outage Continuation Code [8]

4.2. DC Circuit Detailed Automatic Outage Data

Form 4.2 DC Circuit Automatic Outages

CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.
[2] The Event ID Code is defined on Form 5.
[3] For outages which started in another (previous) reporting year, enter 01/01/yyyy 00:00 as the Outage Start Time, where yyyy is the current reporting year.
[4] Report zero hours and zero minutes Outage Duration for Momentary Outages. For outages that started in a previous reporting year, enter the Outage Duration for the current reporting year only.
[5] For Momentary Outages, do not us the "Unavailable" Cause Code. For Sustained Outages, the "Unavailable" Cause Code may be used for either Initiating Outage Code or the Sustained Outage Code, but not both.
[6] For Momentary Outages, enter "NA-Momentary"
[7] 0 = Outage began and ended within the reporting year; 1= Outage began in the reporting year but continues into the next reporting year; 2 = Outage started in another (previous) reporting year.

DC Circuit Momentary and Sustained Outage Data

			Circuit Terminal Boundaries				
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Outage ID Code	Event ID Code [2]	Voltage Class	AC/DC Terminal Name #1	AC/DC Terminal Name #2	AC/DC Terminal Name #3	TO Element Identifier (DC Circuit)	OH or UG?

Continued…

DC Circuit Momentary and Sustained Outage Data

				Cause Codes			
(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
Fault Type	Outage Initiation Code	Start Time (mm/dd/yyyy hh:mm) (UTC) [3]	Outage Duration hhhh:mm [4]	Initiating Cause Code [5]	Sustained Cause Code [6]	Outage Mode	Outage Continuation Code [7]

4.3. Transformer Detailed Automatic Outage Data

Form 4.3 Transformer Automatic Outages — CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.
[2] The Event ID Code is defined on Form 5.
[3] For outages which started in another (previous) reporting year, enter 01/01/yyyy 00:00 as the Outage Start Time, where yyyy is the current reporting year.
[4] Report zero hours and zero minutes Outage Duration for Momentary Outages. For outages that started in a previous reporting year, enter the
[5] For Momentary Outages, do not us the "Unavailable" Cause Code. For Sustained Outages, the "Unavailable" Cause Code may be used for either
[6] For Momentary Outages, enter "NA-Momentary"
[7] 0 = Outage began and ended within the reporting year; 1= Outage began in the reporting year but continues into the next reporting year; 2 = Outage started in another (previous) reporting year.

Transformer Momentary and Sustained Outage Data

(A)	(B)	(C)	(D)	(G)	(J)	(K)	(L)
Outage ID Code	Event ID Code [2]	High-Side Voltage Class	Located at (AC Sub. Name)	TO Element Identifier (Transformer)	Fault Type	Outage Initiation Code	Start Time (mm/dd/yyyy hh:mm) (UTC) [3]

Continued…

Transformer Momentary and Sustained Outage Data

	Cause Codes			
(M)	(N)	(O)	(P)	(Q)
Outage Duration hhhh:mm [4]	Initiating Cause Code [5]	Sustained Cause Code [6]	Outage Mode	Outage Continuation Code [7]

4.4. AC/DC Back-to-Back Converter Detailed Automatic Outage Data

Form 4.4 AC/DC BTB Converter Outages — CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.
[2] The Event ID Code is defined on Form 5.
[3] Report the highest terminal AC voltage (phase-to-phase).
[4] Report zero hours and zero minutes Outage Duration for Momentary Outages.
[5] For Momentary Outages, do not us the "Unavailable" Cause Code. For Sustained Outages, the "Unavailable" Cause Code may be used for either Initiating Outage Code or the Sustained Outage Code, but not both.
[6] For Momentary Outages, enter "NA-Momentary"
[7] 0 = Outage began and ended within the reporting year; 1= Outage began in the reporting year but continues into the next reporting year; 2 = Outage started in another (previous) reporting year.

AC/DC Back-to-Back Converter Momentary and Sustained Outage Data

(A)	(B)	(C)	(D)	(G)	(J)	(K)	(L)
Outage ID Code	Event ID Code [2]	Voltage Class [3]	Converter Name	TO Element Identifier (AC/DC BTB)	Fault Type	Outage Initiation Code	Start Time (mm/dd/yyyy hh:mm) (UTC)

Continued…

AC/DC Back-to-Back Converter Momentary and Sustained Outage Data

	Cause Codes			
(M)	(N)	(O)	(P)	(Q)
Outage Duration hhhh:mm [4]	Initiating Cause Code [5]	Sustained Cause Code [6]	Outage Mode	Outage Continuation Code [7]

Appendix 5 Form for Event ID Code and Event Type Number Data

5. Event ID Code and Event Type Number Data

Form 5 Event ID Code and Event Type Number Data — CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.

[2] The Event ID Code must be appended by the reporting year no. (e.g., 2008). For the 1st quarter submissions in 2008, use "2008" and not "2008Q1" since this Event ID Code will be used for the entire reporting year.

[3] See the Table above for Event Type No. Note that if Event Type No. 10 or 20 is selected, the Outage Mode on column P on Forms 4.1, 4.2, or 4.3 must be "Single Mode Outage." Outages of an AC/DC Back-to-Back Converter (Form 4.4) must select Event Type No. 50.

[4] Optional input: Provide a brief description of the Event outage(s) for any Event ID Code. Please limit the description to 500 characters or less.

[5] Was an EOP-004 report filed at NERC that was associated with the Event? Year-to-date public (i.e., non-confidential) data of all disturbance report filings are located at http://www.nerc.com/~filez/dawg-disturbancereports.html.

Event Type No.	Table 1 Category from the TPL Standards	Description
10	B	Automatic Outage of an AC Circuit or Transformer with Normal Clearing.
20	B	Automatic Outage of a DC Circuit with Normal Clearing.
30	C	Automatic Outage of two ADJACENT AC Circuits on common structures with Normal
40	C	Automatic Outage of two ADJACENT DC Circuits on the common structures with Normal
50	NA	Other - please describe the event (optional)

Event ID Code Data

(A) Event ID Code [2]	(B) Event Type No. [3]	Description of the Event (optional) [4]	(D) Disturbance Report Filed [5]

Please comment on this entire Appendix 10

Appendix 6 Forms for Detailed Non-Automatic Outage Data

6.1 AC Circuit Detailed Non-Automatic Outage Data

Form 6.1 AC Non-Automatic Circuit Outages CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.
[2] For outages which started in another (previous) reporting year, enter 01/01/yyyy 00:00 as the Outage Start Time, where yyyy is the current reporting year.
[3] For outages that started in a previous reporting year, enter the Outage Duration for the current reporting year only.
[4] Enter "NA" if the outage is ***NOT*** a Planned Outage
[5] Enter "NA" if the outage is ***NOT*** a Operational Outage
[6] 0 = Outage began and ended within the reporting year; 1= Outage began in the reporting year but continues into the next reporting year; 2 = Outage started in another (previous) reporting year.

AC Circuit Non-Automatic Outage Data							
		Circuit Substation Boundaries					
(A)	(C)	(D)	(E)	(F)	(G)	(H)	(K)
Outage ID Code	Voltage Class	AC Substation Name #1	AC Substation Name #2	AC Substation Name #3	TO Element Identifier (AC Circuit)	OH or UG?	Non-Automatic OutageType

Continued…

AC Circuit Non-Automatic Outage Data				
		Cause Codes		
(L)	(M)	(N)	(O)	(Q)
Start Time (mm/dd/yyyy hh:mm) (UTC) [2]	Outage Duration hhhh:mm [3]	Planned Outage Cause Code [4]	Operational Outage Cause Code [5]	Outage Continuation Code [6]

Please comment on this entire Appendix 10

6.2 DC Circuit Detailed Non-Automatic Outage Data

Form 6.2 DC Circuit Non-Automatic Outages — CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.
[2] For outages which started in another (previous) reporting year, enter 01/01/yyyy 00:00 as the Outage Start Time, where yyyy is the current reporting year.
[3] For outages that started in a previous reporting year, enter the Outage Duration for the current reporting year only.
[4] Enter "NA" if the outage is ***NOT*** a Planned Outage
[5] Enter "NA" if the outage is ***NOT*** a Operational Outage
[6] 0 = Outage began and ended within the reporting year; 1= Outage began in the reporting year but continues into the next reporting year; 2 = Outage started in another (previous) reporting year.

DC Circuit Non-Automatic Outage Data								
		Circuit Terminal Boundaries						
(A)	(C)	(D)	(E)	(F)	(G)		(H)	(K)
Outage ID Code	Voltage Class	AC/DC Terminal Name #1	AC/DC Terminal Name #2	AC/DC Terminal Name #3	TO Element Identifier	(DC Circuit)	OH or UG?	Non-Automatic OutageType

Continued…

DC Circuit Non-Automatic Outage Data				
		Cause Codes		
(L)	(M)	(N)	(O)	(Q)
Start Time (mm/dd/yyyy hh:mm) (UTC) [	Outage Duration hhhh:mm [3	Planned Outage Cause Code [4]	Operational Outage Cause Code [5]	Outage Continuation Code [6

Please comment on this entire Appendix 10

6.3 Transformer Detailed Non-Automatic Outage Data

Form 6.3 Transformer Non-Automatic Outages — CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.
[2] For outages which started in another (previous) reporting year, enter 01/01/yyyy 00:00 as the Outage Start Time, where yyyy is the current reporting year.
[3] For outages that started in a previous reporting year, enter the Outage Duration for the current reporting year only.
[4] Enter "NA" if the outage is ***NOT*** a Planned Outage
[5] Enter "NA" if the outage is ***NOT*** a Operational Outage
[6] 0 = Outage began and ended within the reporting year; 1= Outage began in the reporting year but continues into the next reporting year; 2 = Outage started in another (previous) reporting year.

Transformer Non-Automatic Outage Data

(A)	(C)	(D)	(G)	(K)	(L)
Outage ID Code	High-Side Voltage Class	Located at (AC Sub. Name)	TO Element Identifier (Transformer)	Non-Automatic OutageType	Start Time (mm/dd/yyyy hh:mm) (UTC) [2]

Continued…

Transformer Non-Automatic Outage Data

	Cause Codes		
(M)	(N)	(O)	(Q)
Outage Duration hhhh:mm [3]	Planned Outage Cause Code [4]	Operational Outage Cause Code [5]	Outage Continuation Code [6]

Please comment on this entire Appendix 10

6.4 AC/DC Back-to-Back Converter Detailed Non-Automatic Outage Data

Form 6.4 AC/DC BTB Converter Non-Automatic Outages — CONFIDENTIAL INFORMATION

Notes:

[1] If a TO owns or reports on Elements in a different NERC Region or in a different country, provide data for each Region and country in a separate workbook.
[2] Report the highest terminal AC voltage (phase-to-phase).
[3] For outages which started in another (previous) reporting year, enter 01/01/yyyy 00:00 as the Outage Start Time, where yyyy is the current reporting year.
[4] For outages that started in a previous reporting year, enter the Outage Duration for the current reporting year only.
[5] Enter "NA" if the outage is NOT a Planned Outage
[6] Enter "NA" if the outage is NOT a Operational Outage
[7] 0 = Outage began and ended within the reporting year; 1= Outage began in the reporting year but continues into the next reporting year; 2 = Outage started in another (previous) reporting year.

AC/DC Back-to-Back Converter Non-Automatic Outage Data					
(A)	(C)	(D)	(G)	(K)	(L)
Outage ID Code	Voltage Class [2]	Converter Name	TO Element Identifier (AC/DC BTB)	Non-Automatic Outage Type	Start Time (mm/dd/yyyy hh:mm) (UTC) [3]

Continued…

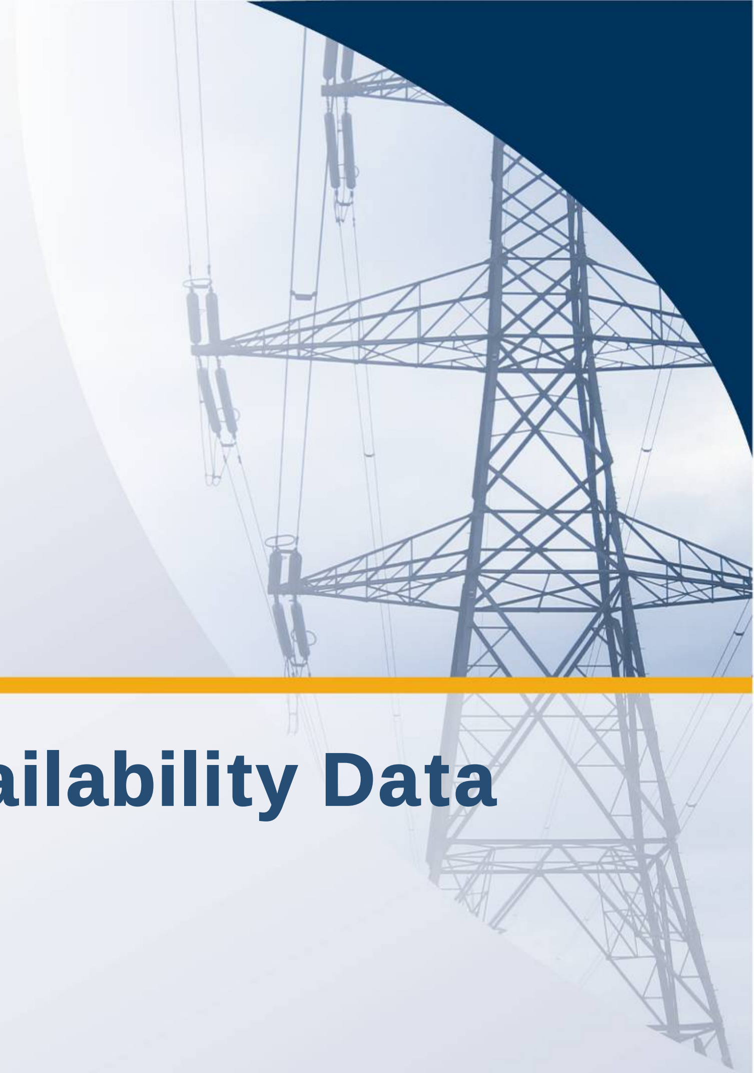
AC/DC Back-to-Back Converter Non-Automatic Outage Data			
	Cause Codes		
(M)	(N)	(O)	(Q)
Outage Duration hhhh:mm [4]	Planned Outage Cause Code [5]	Operational Outage Cause Code [6]	Outage Continuation Code [7]

Appendix 7 TADS Definitions

The *TADS Definitions* is a separate document with its own page numbering.

NERC

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION



Transmission Availability Data System (TADS)

DEFINITIONS

April 4, 2008

to ensure the reliability of the bulk power system

116-390 Village Blvd., Princeton, NJ 08540
609.452.8060 | 609.452.9550 fax
www.nerc.com

Table of Contents

A. TADS Population Definitions

1. Element

The following are Elements for which TADS data are to be collected:

1. AC Circuits ≥ 200 kV (Overhead and Underground)
2. Transformers with ≥ 200 kV low-side voltage
3. AC/DC Back-to-Back Converters with ≥ 200 kV AC voltage, both sides
4. DC Circuits with ≥ +/-200 kV DC voltage

An Element may also be referred to as a "TADS Element" in the Manual. They have the same meaning.

2. Protection System

Protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuitry.[1]

3. AC Circuit

A set of AC overhead or underground three-phase conductors that are bound by AC Substations. Radial circuits are AC Circuits.

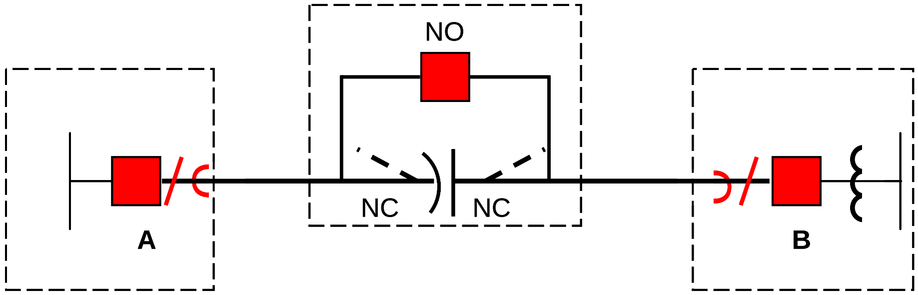
The boundary of an AC Circuit extends to the transmission side of an AC Substation. A circuit breaker, Transformer, and their associated disconnect switches are not considered part of the AC Circuit but instead are defined as part of the AC Substation. The AC Circuit includes the conductor, transmission structure, joints and dead-ends, insulators, ground wire, and other hardware, including in-line switches. The AC Circuit includes in-line switches used to sectionalize portions of the AC Circuit as well as series compensation (capacitors and reactors) that is within the boundaries of the AC Circuit even if these 'in-line' devices are within an AC Substation. If these devices are not within the AC Circuit boundaries, they are not part of the AC Circuit but instead are part of the AC Substation. The diagrams on the next several pages explain this concept. The red arcs define the AC Circuit boundaries.[2]

In Figure 1 (next page), the series capacitor, bypass circuit breaker, and numerous disconnect switches are in a fenced AC Substation that is within the boundaries of the AC Circuit itself. When the series capacitor is connected and the bypass breaker is open, the capacitor and its disconnect switches are part of the AC Circuit. When the bypass breaker is closed, the bypass breaker and its disconnect switches (not shown) are part of the AC Circuit.

[1] This definition is in the current NERC *Glossary of Terms Used in Reliability Standards*.
[2] To simplify future diagrams, disconnect switches may not be shown.

Figure 1

Two in-line NC switches and one series capacitor are part of the AC Circuit between AC Substations A and B. When the bypass breaker and its disconnect switches (not shown) are closed and the capacitor switches opened, the breaker and its switches are part of the AC Circuit.



In Figure 2, the series reactor and in-line switches are part of the AC Circuit since they are within the AC Circuit boundaries even though they are within the AC Substation boundaries. In Figure 3, they are not part of the AC Circuit because they are not within the AC Circuit boundaries.

Figure 2

Two in-line NC switch and one series reactor are part of the AC Circuit between AC Substations A and B. The AC Circuit boundaries are the breaker disconnect switch in AC Substation A and the high-side disconnect switch on the Transformer in AC Substation B.

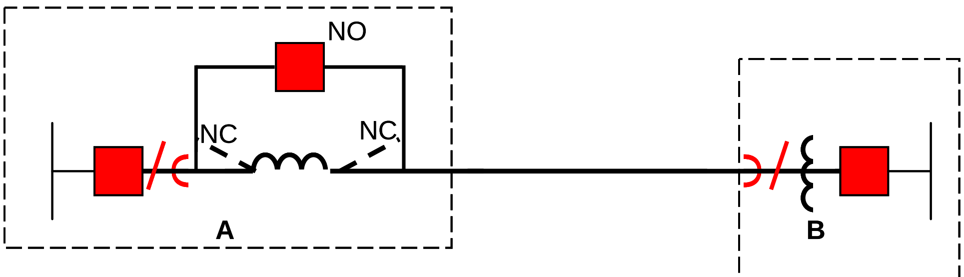
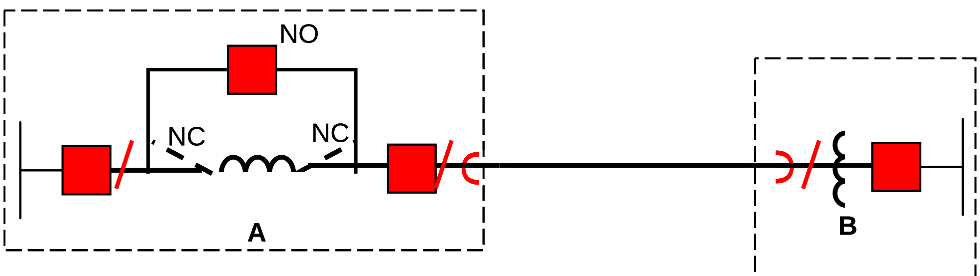


Figure 3

Two in-line NC switches and one series reactor are part of the AC Substation and not part of the AC Circuit between AC Substations A and B



4. Transformer

A bank comprised of three single-phase transformers or a single three-phase transformer. A Transformer is bounded by its associated switching or interrupting devices.

5. AC Substation

An AC Substation includes the circuit breakers and disconnect switches which define the boundaries of an AC Circuit, as well as other facilities such as surge arrestors, buses, Transformers, wave traps, motorized devices, grounding switches, and shunt capacitors and reactors. Series compensation (capacitors and reactors) is part of the AC Substation if it is not part of the AC Circuit. See the explanation in the definition of "AC Circuit." Protection System equipment is excluded.

6. AC/DC Terminal

A terminal that includes all AC and DC equipment needed for DC operation such as PLC (power-line carrier) filters, AC filters, reactors and capacitors, Transformers, DC valves, smoothing reactors and DC filters. On the AC side, an AC/DC Terminal is normally bound by AC breakers at the AC Substation bus where it is connected. On the DC side, it is bound by DC converters and filters. Protection System equipment is excluded.

7. AC/DC Back-to-Back Converter

Two AC/DC Terminals in the same location with a DC bus between them. The boundaries are the AC breakers on each side.

8. DC Circuit

One pole of an Overhead or Underground DC line which is bound by an AC/DC Terminal on each end.

9. Overhead Circuit

An AC or DC Circuit that is not an Underground Circuit. A cable conductor AC or DC Circuit inside a conduit which is *not* below the surface is an Overhead Circuit. A circuit that is part Overhead and part Underground is to be classified based upon the majority characteristic (Overhead Circuit or Underground Circuit) using Circuit Miles.

10. Underground Circuit

An AC or DC Circuit that is below the surface, either below ground or below water. A circuit that is part Overhead Circuit and part Underground Circuit is to be classified based upon the majority characteristic (Overhead Circuit or Underground Circuit) using Circuit Miles.

11. Circuit Mile

One mile of either a set of AC three-phase conductors in an Overhead or Underground AC Circuit, or one pole of a DC Circuit. A one mile-long, AC Circuit tower line that carries two three-phase circuits (i.e., a double-circuit tower line) would equate to two Circuit Miles. A one mile-long, DC tower line that carries two DC poles would equate to two Circuit Miles. Also, a one mile-long, common-trenched, double-AC Circuit Underground duct bank that carries two three-phase circuits would equate to two Circuit Miles.

12. Multi-Circuit Structure Mile

A one-mile linear distance of sequential structures carrying multiple Overhead AC or DC Circuits. (Note: this definition is *not* the same as the industry term "structure mile." A Transmission Owner's Multi-Circuit Structure Miles will generally be less than its structure miles since not all structures contain multiple circuits.)

If a line section contains two or more Multi-Circuit Structures which form one or more multi-circuit spans, the total span length can be measured and the associated mileage should be reported in the 'Multi-Circuit Structure Mile' total inventory. If multiple circuits are connected to only one common structure, that structure should be ignored for outage and inventory mileage purposes.

13. Voltage Class

The following voltages classes will be used for reporting purposes:

1. 200 – 299 kV
2. 300 – 399 kV
3. 400 – 499 kV
4. 500 – 599 kV
5. 600 – 799 kV

For Transformers, the Voltage Class reported will be the high-side voltage, even though the cut-off voltage used in the definition is referenced on the low-side. Voltages are operating voltages.

B. Outage Reporting Definitions

1. Automatic Outage

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

2. 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.

3. Sustained Outage:[3]

An Automatic Outage with an Outage Duration of a minute or greater.

[3] The TADS definition of Sustained Outage is different that the NERC *Glossary of Term Used in Reliability Standards* definition of Sustained Outage which is presently only used in FAC-003-1. The glossary defines a Sustained Outage as follows: "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.

4. Non-Automatic Outage

An outage which results from the manual operation (including supervisory control) of a switching device, causing an Element to change from an In-Service State to a not In-Service State.

5. Planned Outage

A Non-Automatic Outage with advance notice for the purpose of maintenance, construction, inspection, testing, or planned activities by third parties that may be deferred. Outages of TADS Elements of 30 minutes or less duration resulting from switching steps or sequences that are performed in preparation or restoration of an outage of another TADS Element are not reportable.

6. 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.

7. AC Multi-Owner Common Structure Flag

This flag identifies whether the outaged AC Circuit is on common structures with another circuit that is owned by a different Transmission Owner. This flag does not apply to DC Circuits which by default are all assumed to be on common structures with the circuits owned by the same Transmission Owner.

Flag	Flag Interpretation
0	Not applicable. The circuit is not on common structures with another circuit, or the circuit is on common structures, but all circuits are reported by the same Transmission Owner. No analysis of the Event ID Code or the Event Type Number is required by the Regional Entity.
1	Circuit is on common structures with another circuit that is being reported by a different Transmission Owner. The Regional Entity will need to examine Outage Start Times with this same flag to determine whether a second circuit had an outage with nearly the same Outage Start Time, and if so, whether the TOs properly coordinated their Event ID Codes and Event Type Numbers.

8. In-Service State

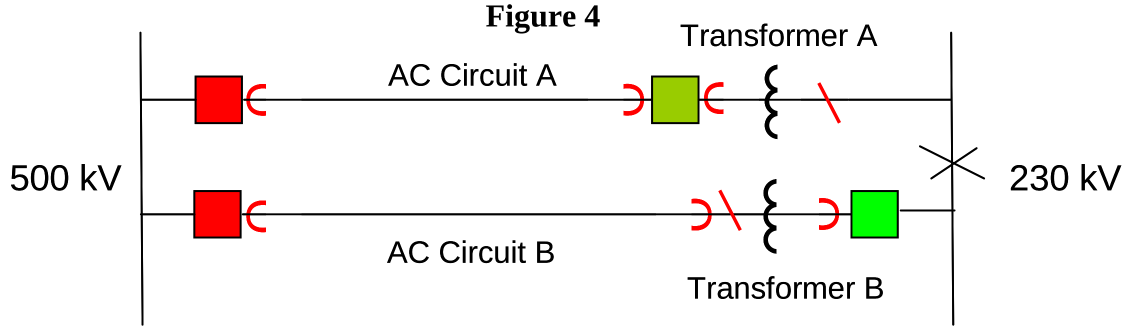
An Element that is energized and fully connected to the system. Examples of reportable AC Circuit and Transformer Automatic Outages are illustrated below. Non-Automatic Outage examples are in Appendix 10.

In Figure 4, AC Circuit A is bound by the disconnect switches (not shown)[4] of two breakers, and Transformer A is bound by a breaker and a disconnect switch. AC Circuit B is bound by a breaker and a disconnect switch, and Transformer B is bound by a breaker and a disconnect switch. 230 kV bus fault opens the green breakers. The TADS Transformers each report an outage. AC Circuit A reports an outage, but AC Circuit B

[4] For simplification, disconnect switches may not be show in some figures. When a circuit breaker or Transformer disconnect switch define an AC Circuit boundary, we may just refer to the circuit breaker and the Transformer as defining the boundary without reference to their disconnect switches.

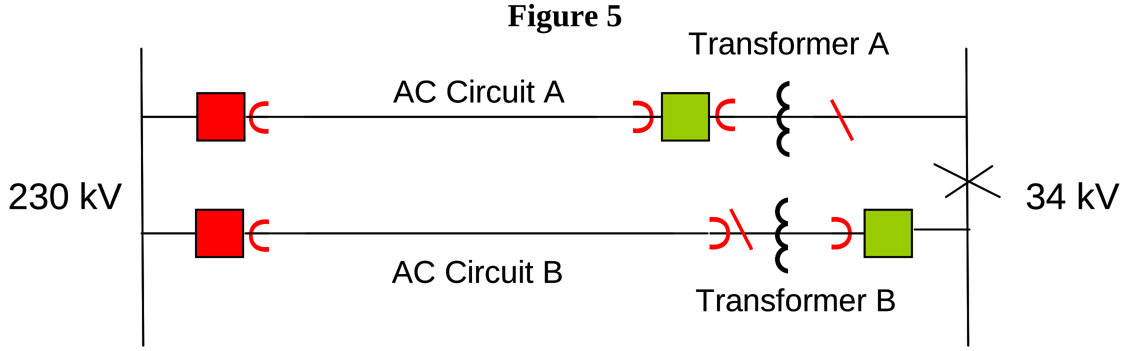
does not. It is defined by the breaker on the left and the disconnect switch on the right. Since the breaker associated with AC Circuit B did not experience and automatic operation, it was not outaged. It remains fully connected by the breaker and the disconnect switch.

Figure 4



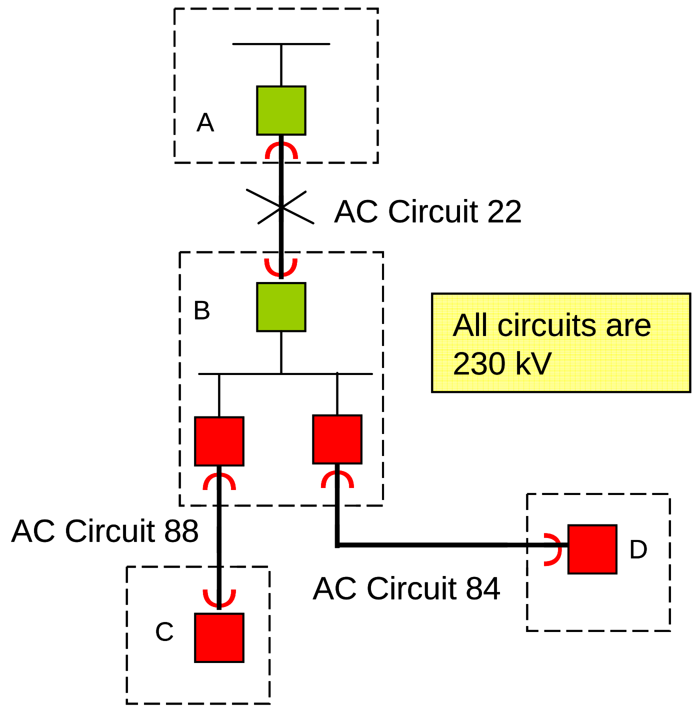
In Figure 5, we have a similar situation, except that the Transformers are not reportable since their low-side voltages are less that 200 kV. The AC Circuit outages are reportable exactly the same as in Figure 4; however, the Transformer outages are not reportable.

Figure 5



In Figure 6 (next page), AC Circuit 22, the only source connecting AC Substations A and B, has a fault. As a result, AC Circuits 84 and 88 are deenergized but remain fully connected. Three outages are reported: circuits 22, 84, and 88. None of them meet the In-Service State requirement of being energized *and* fully connected.

Figure 6



An exception that an Element be "fully connected" to be considered in an In-Service State is provided for a multi-terminal AC Circuit with a Transformer on one terminal that shares a breaker with the circuit.

Figure 7

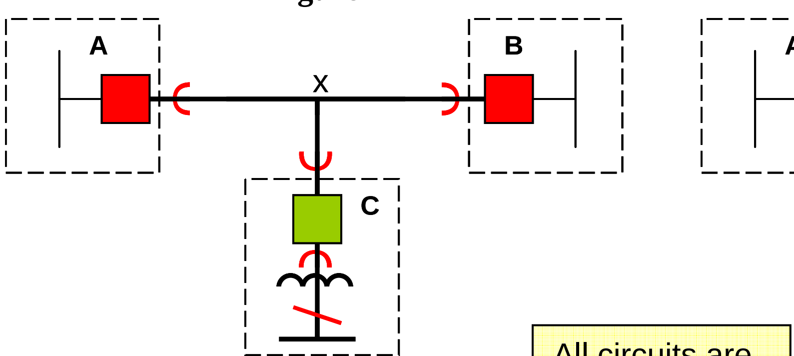
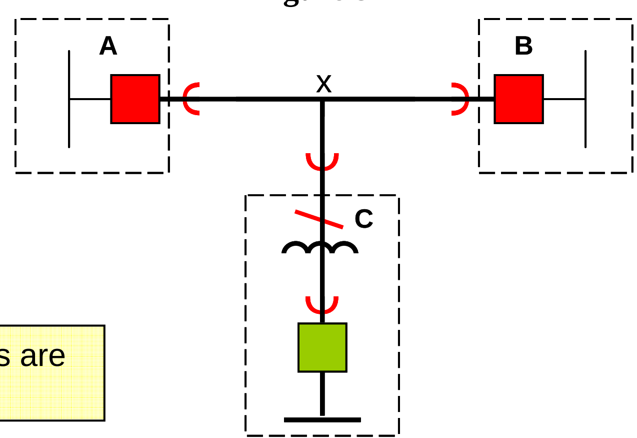


Figure 8



In both figures, the AC Circuit is bounded by AC Substations "A," "B," and "C" as indicated by the red arcs. Each Transformer's boundaries are the red disconnect switch and the red arc before the breaker. Note that the Transformer in either figure may *or* may not be a reportable Element (i.e., one with a low-side voltage ≥ 200 kV).

Assume that each Transformer is out of service as a result of the operation of its associated breaker (indicated in green). In Figure 7, the AC Circuit would normally be considered out of service since the breaker at AC Substation C, which is shared by the AC Circuit and the Transformer, is open. Nevertheless, if all other portions of the AC Circuit are in service, the entire AC Circuit is considered to be in an In-Service State even if the Transformer is out of service. Because TADS does not recognize partial outage states, the multi-terminal exception above was developed so as to not overstate the outage contribution of a multi-terminal configuration of this type. In Figure 8, the open breaker is not shared by the AC Circuit, and the AC Circuit remains fully connected. Thus, the exception does not apply in this case since the AC Circuit is fully connected even though the Transformer out of service.

9. Substation, Terminal, or Converter Name

For Automatic Outages or Non-Automatic Outages of AC Circuits and DC Circuits, the termination name at each end of the circuit will be reported to help identify *where* the circuit is located. For AC Circuits, these are the AC Substation Names; for DC Circuits, these are the AC/DC Terminal Names. For AC/DC Back-to-Back Converters, this is the Converter Station Name.

10. TO Element Identifier

An alphanumeric name that the TO must enter to identify the Element which is outaged (e.g., a circuit name.)

11. Outage Start Time

The date (mm/dd/yyyy) and time (hhhh:mm), rounded to the minute, that the Automatic Outage or Non-Automatic Outage of an Element started. Outage Start Time is expressed in Coordinated Universal Time (UTC), not local time. TADS data is reported on a calendar-year basis, and the TADS Data Reporting Instruction Manual addresses the recording of the Outage Start time of a Sustained Outage that starts in one reporting year and concludes in another reporting year.

12. Outage Duration

The amount of time from the Outage Start Time to when the Element is fully restored to its original or to normal configuration, including equipment replacement. Outage Duration is expressed as hours and minutes, rounded to the nearest minute. Momentary Outages are assigned a time of zero Outage Duration. TADS data is reported on a calendar-year basis, and the TADS Data Reporting Instruction Manual addresses the recording of the Outage Durations of an outage that starts in one reporting year and concludes in another reporting year.

13. Outage Continuation Flag

Not all outages start and end in the same reporting year. This flag describes that characteristic for an outage.

Flag	Flag Interpretation
0	Outage began and ended within the reporting year
1	Outage began in the reporting year but continues into the next reporting year.
2	Outage started in another (previous) reporting year.

14. Outage Identification (ID) Code

A unique alphanumeric identifier assigned by the Transmission Owner to identify the reported outage of an Element.

15. Event

An Event is a transmission incident that results in the Automatic Outage (Sustained or Momentary) of one or more Elements.

16. Event Identification (ID) Code

A unique alphanumeric identifier assigned by the Transmission Owner to an Event. Because outages that begin in one reporting year and end in the next reporting year must have the same Event ID Code, the code must have the reporting year appended to it to ensure its uniqueness. For example, an Event ID Code may be W324-2008. This unique Event ID Code establishes an easy way to identify which Automatic Outages are related to one another as defined by their Outage Mode Codes (see Section D).

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.

17. Event Type Number

A code that describes the type of Automatic Outage. The following Event Type Numbers will be used initially:

Event Type No.	Table 1 Category from the TPL Standards	Description
10	B	Automatic Outage of an AC Circuit or Transformer with Normal Clearing.
20	B	Automatic Outage of a DC Circuit with Normal Clearing.
30	C	Automatic Outage of two ADJACENT AC Circuits on common structures with Normal Clearing.
40	C	Automatic Outage of two ADJACENT DC Circuits on common structures with Normal Clearing.
50	NA	Other - please describe the event (optional)

To qualify for an Event Type No. 30 or 40, the outages must be a direct result of the circuits occupying common structures. These characteristics will generally apply.

1. The Outage Initiation Codes are either Element-Initiated or Other-Element Initiated.
2. The Outage Mode Codes are one of the following: (a) Dependent Mode Initiating (one outage) and Dependent Mode (second outage); (b) Common Mode Initiating and Common Mode (two outages); or (c) both Common Mode (two outages).

Event Type No. 30 and 50 Examples

These are examples of Events that are Event Type No. 30:

1. A tornado outages two circuits on common structures. In this example, the outage is Element-Initiated and Common Mode. This is an Event Type No. 30 because the loss of both circuits was directly related to them being on the same structures.

2. On one circuit, a conductor breaks (outaging the circuit), and the conductor swings into a second circuit on common structures. The first circuit outage is Element-Initiated and Dependent Mode Initiating; the second circuit outage is Other-Element Initiated and Dependent Mode. This is an Event Type No. 30 because the second circuit's outage was a result of it being on common structures as the first circuit.

These Events are not an Event Type No. 30; instead, they are an Event Type No. 50.

1. Two AC Circuits on common structures are outaged due to a bus fault in the AC Substation where the circuits terminate. Both outages are Substation-Initiated and Common Mode. Because the outages are not a result of the two circuits being on common structures, it is not an Event Type No. 30. Therefore, it is an Event Type No. 50.
2. Two AC Circuits are on common structures and terminate at the same bus. Lightning strikes one AC Circuit, but the breaker fails to open due to a failure of a relay to operate properly. The second circuit, which is connected to the same bus, is outaged as a result of the failure of first circuit's breaker to open. The first outage is an Element-Initiated and Dependent Mode Initiating; the second outage is Other Facility-Initiated and Dependent Mode. (Note: the relay is excluded as part of an AC Substation, making the Outage Initiation Code "Other-Facility Initiated" and not "Substation-Initiated.") Because the outages are not a result of the two circuits being on common structures, it is not an Event Type No. 30. Therefore, it is an Event Type No. 50.

18. Fault Type

The descriptor of the fault, if any, associated with each Automatic Outage of an Element. Several choices are possible for each Element outage:

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

The Fault Type for each Element outage may be determined from recorded relay targets or by other analysis. TOs should use the best available data to determine (1) whether a fault occurred on each outaged Element and, if so, (2) what type of fault occurred. Relay targets should be documented as soon as practical after a fault and the targets re-set to prepare for the next fault. If a single fault results in several Element outages, the protective relay targets associated with each Element indicate the Fault Type for that Outage. Relay targets are not a fool proof method to determine the Fault Type; however, they may be the best available data to determine Fault Type. An Element whose relays did not indicate a fault should be reported as "No fault."

Example: A 500 kV AC Circuit has a single phase-to-ground fault that also results in an Outage of a 500/230 kV Transformer. The AC Circuit outage would have "Single phase-to-ground fault (P-G)" selected as the Fault Type, while the Transformer would have "No fault" selected.

19. Normal Clearing

A protection system operates as designed and the fault is cleared in the time normally expected with proper functioning of the installed protection system.[5]

C. Outage Initiation Codes

The Outage Initiation Codes describe *where* an Automatic Outage was initiated on the power system.

1. Element-Initiated Outage

An Automatic Outage of an Element that is initiated on or within the Element that is outaged.

2. Other Element-Initiated Outage

An Automatic Outage of an Element that is initiated by another Element and not by the Element that is outaged.

3. AC Substation-Initiated Outage

An Automatic Outage of an Element that is initiated on or within AC Substation facilities.

4. AC/DC Terminal-Initiated Outage

An Automatic Outage of an Element that is initiated on or within AC/DC Terminal facilities.

5. 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* an 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.)

<u>Outage Initiation Code Examples</u>

1. A Transformer which is an Element is outaged. Is its outage an Element-Initiated Outage or a 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 Substation-Initiated.
2. An AC Circuit which is an Element has an outage that was initiated by a non-Element AC Circuit. The Element outage is Other Facility-Initiated.
3. An AC Circuit Outage was initiated by an Element Transformer outage. The AC Circuit Outage is Other Element-Initiated.

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[5] This definition is in the current NERC *Glossary of Terms Used in Reliability Standards*.

D. Outage Mode Codes

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

1. Single Mode Outage

An Automatic Outage of a single Element which occurred independent of any other outages (if any).

2. Dependent Mode Initiating Outage

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

3. Dependent Mode Outage

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

4. Common Mode Outage

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

5. Common Mode Initiating Outage

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

Dependent Mode and Common Mode Outage Examples

1. A Dependent Mode Outage involves two outages, but one of the outages can be a non-Element outage. Therefore, not all Dependent Mode Outages will have an associated Dependent Mode Initiating Outage. If the initiating outage is one of the four defined Elements, that outage will be a Dependent Mode Initiating Outage, and the resulting second Element outage will be a Dependent Mode Outage. For example, suppose a 500 kV AC Circuit is outaged as a result of a 500/230 kV Transformer outage. The AC Circuit outage is a Dependent Mode Outage, and the Transformer outage is a Dependent Mode Initiating Outage. However, if an outage is not initiated by an Element, it will not have an associated Dependent Mode Initiating Outage. If the Transformer in the previous example had been a 345/138 kV Transformer and the AC Circuit a 345 kV circuit, the Transformer would not be an Element and, therefore, the AC Circuit outage would not have an associated Dependent Mode Initiating Outage. The AC Circuit outage would be classified as a Dependent Mode Outage since it was the result of a non-Element outage.
2. A Common Mode Outage involves the two outages, but unlike a Dependent Mode Outage, both outages must be Elements. In addition, one outage must not cause the second outage to occur; i.e., the two outages are not consequences of each other. In addition, they must occur nearly simultaneously. As an example, suppose that lightning strikes two AC Circuits in the same right of way (but not

on a common structure) and both circuits are outaged nearly simultaneously. Assume no further outages occur. Both are Common Mode Outages. Now assume the same scenario with a slight difference: one AC Circuit clears normally, the second AC Circuit does not, and there is a circuit breaker failure, resulting in the outage of a third AC Circuit. The first AC Circuit outage is a Common Mode Outage. The second AC Circuit outage is a Common Mode Initiating Outage, with the third AC Circuit outage a Dependent Mode Outage.

E. Cause Codes Types

1. Initiating Cause Code

The Cause Code that describes the initiating cause of the outage.

2. Sustained Cause Code

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

<u>Initiating and Sustained Cause Code Examples</u>

Suppose a lightning strike on an AC Circuit that should have cleared normally becomes a Sustained Outage because of breaker failure. “Lightning” is the Initiating Cause Code and “Failed AC Substation Equipment” is the Sustained Cause Code.

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

<u>Special Exception for 2008 Reporting:</u> For reporting in 2008, Transmission Owners should supply both the Initiating and Sustained Cause Codes if they have them available. However, if both Cause Codes are not available, at least one Cause Code, either Initiating or Sustained, must be supplied for a Sustained Outage. (Momentary Outages still must have their Initiating Cause Code reported.) As an example, suppose a TO only has the Initiating Outage Cause Code available to it for Sustained Outages. The Initiating Cause Code would be entered for each outage, and the appropriate Sustained Cause Code would be “Unavailable.” On the other hand, suppose only a Sustained Cause Code is available. Sustained Outages would then have their Initiating Outage Codes reported as “Unavailable.” The “Unavailable” code will be deleted in 2009 when TOs are expected to have both Initiating and Sustained Cause Codes available.

F. Cause Codes

1. Weather, excluding lightning

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

2. Lightning

Automatic Outages caused by lightning.

3. Environmental

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

4. Contamination

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

5. Foreign Interference

Automatic Outages caused by foreign interference from such objects such as an aircraft, machinery, a vehicle, a train, a boat, a balloon, a kite, a bird (including streamers), an animal, flying debris not caused by wind, and falling conductors from one line into another. Foreign Interference is not due to an error by a utility employee or contractor. Categorize these as "Human Error."

6. Fire

Automatic Outages caused by fire or smoke.

7. Vandalism, Terrorism or Malicious Acts

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

8. Failed AC Substation Equipment

Automatic Outages caused by the failure of AC Substation; i.e., equipment "inside the substation fence" including Transformers and circuit breakers but excluding Protection System equipment. Refer to the definition of "AC Substation."

9. Failed AC/DC Terminal Equipment

Automatic Outages caused by the failure of AC/DC Terminal equipment; i.e., equipment "inside the terminal fence" including PLC (power-line carrier) filters, AC filters, reactors and capacitors, Transformers, DC valves, smoothing reactors, and DC filters but excluding Protection System equipment. Refer to the definition of "AC/DC Terminal."

10. Failed Protection System Equipment

Automatic Outages caused by the failure of Protection System equipment. Includes any relay and/or control misoperations *except* those that are caused by incorrect relay or control settings that do not coordinate with other protective devices. Categorize these as "Human Error".

11. Failed AC Circuit Equipment

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

12. Failed DC Circuit Equipment

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

13. Vegetation

Automatic Outages (both Momentary and Sustained) caused by vegetation, with the exception of the following exclusions which are contained in FAC-003-1:

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

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

14. Power System Condition

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

15. 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. Also, any human failure or interpretation of standard industry practices and guidelines that cause an outage will be reported in this category.

16. Unknown

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

17. Other

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

18. Unavailable

Use for Sustained Outages for which either the Initiating or Sustained Cause Codes are unavailable to the Transmission Owner. If a Transmission Owner uses this code for Sustained Outages, it should be used on only *one* type of Cause Code (Initiating or Sustained), whichever is unavailable. If during 2008, both Cause Codes become available to the Transmission Owner, stop using "Unavailable." The "Unavailable" code will be withdrawn in 2009.

G. Planned Outage Cause Codes

1. Maintenance and Construction

Use for Planned Outages associated with maintenance and construction of electric facilities, including testing. This includes requests from any entity that is defined in the NERC Functional Model.[6]

2. Third-Party Requests

Use for Planned Outages that are taken at the request of a third party such as highway departments, the Coast Guard, etc.

3. Other Planned Outage

Use for Planned Outages for reasons not included in the above list, including human error.

H. Operational Outage Cause Codes

1. 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.

2. System Voltage Limit Mitigation

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

3. 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 below.

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[6] The Functional Model is available at http://www.nerc.com/~filez/functionalmodel.html. As an example, an outage is requested by a Generation Operator for purposes of completing an interconnection of its facilities would be classified in the Maintenance and Construction category. A Load-Serving Entity which requests an outage to make repairs to its substation would also be reported in this category.

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

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

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

4. Other Operational Outage

Use for Operational Outages for reasons not included in the above list, including human error.

Appendix 8 Inventory Data Examples

The following examples demonstrate a calculation method that can be used to complete the TADS inventory spreadsheet data on Form 3.1 associated with the number of AC Circuits, the number of Circuit Miles, and the number of Multi-Circuit Structure Miles. However, the methods used to determine the inventory data associated with the number of AC Circuits can be used for any Element.

The TADS Task Force acknowledges that other calculation methods can be utilized to complete the inventory spreadsheet. Every reporting entity must determine the method that is best for their organization.

Base Model:

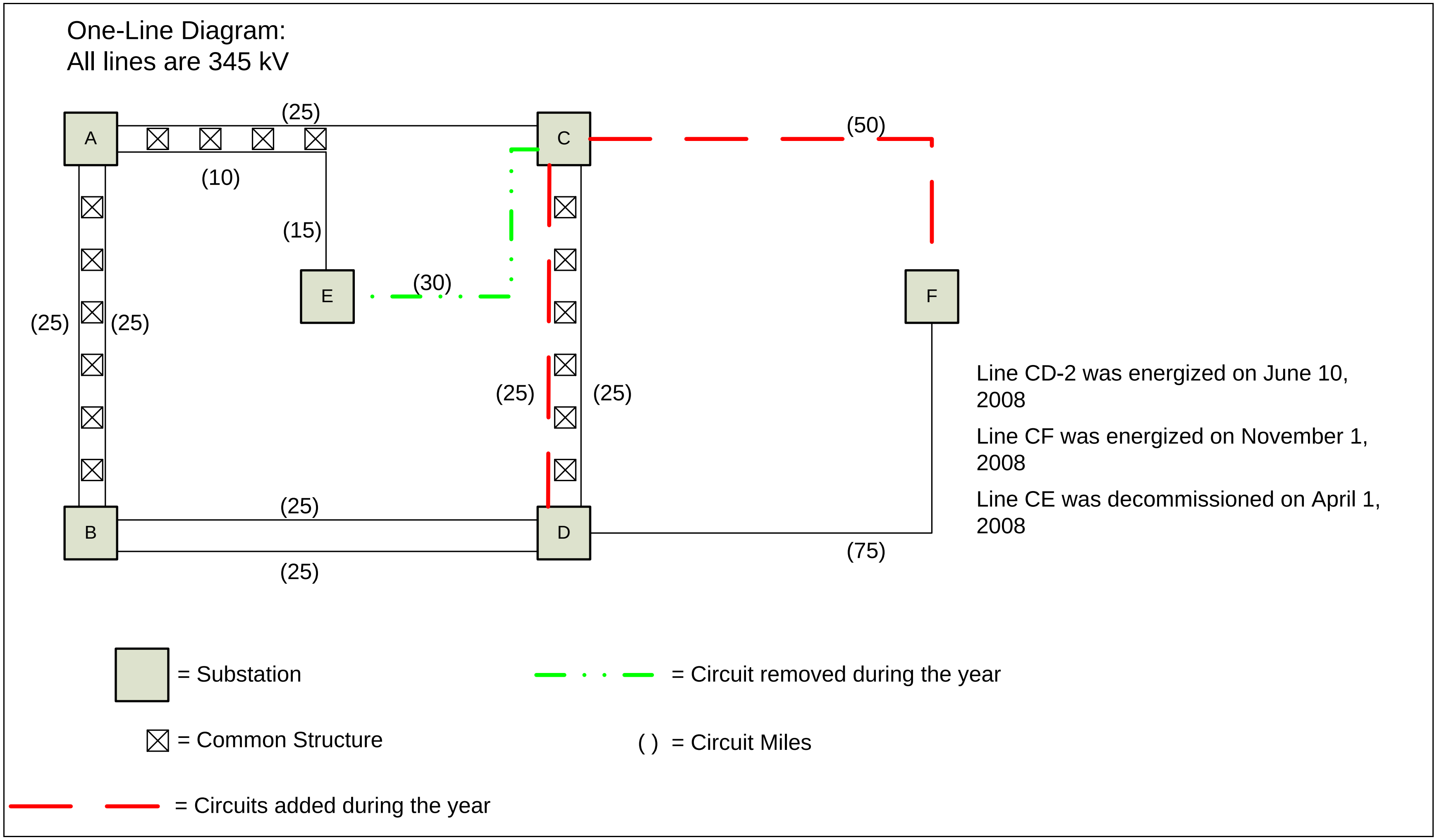


Figure 1: One-line diagram showing both new and removed circuits

Calculation 1: No. of AC Circuits and Circuit Miles that were *in-service* at the end of the reporting year [FORM 3.1]

Circuit Miles calculations
(Elements at the end of the year)

Element Identification	Circuit Miles
AB-1	25
AB-2	25
BD-1	25
BD-2	25
AE	25
AC	25
CD-1	25
DF	75
CD-2	25
CF	50
Total Circuit Miles	325

10 would be entered into the column titled "No. of Circuits (End of Year)"
325 would be entered into the column titled "Circuit miles (End of Year)"

Calculation 2: No. of AC Circuits and Circuit Miles that were *added or removed* during the reporting year [FORM 3.1]

Circuit Miles Calculations
(Elements added, retired or changed during the year)

Element Identification	Circuit Miles	Number of Days from In-Service date to the end of the reporting year	Equivalent Annual Element Value	Equivalent Circuit Miles
CD-2	25	205	.56	14.04
CF	50	61	.17	8.36
		Totals for Elements added	.73	22.4
Element Identification	Circuit Miles	Number of days from retirement/change date to the beginning of the reporting year	Equivalent Annual Element Value	Equivalent Circuit Miles
CE	30	91	.25	7.4
	Total for Elements retired or changed		.25	7.4

2 would be entered into the column titled "No. of Circuits Added"
0.73 would be entered into the column titled "Equivalent Annual No. of Circuits Added [3]" (205/366) + (61/366) = 0.73 **(2008 is a leap year)**
75 would be entered into the column titled "No. of Circuit Miles for Circuits Added"

22.4 would be entered into the column titled “Equivalent Annual No. of Circuit Miles for Circuits Added [3]”

25 Miles (205/366) + 50 Miles (61/366) = 22.4 **(2008 is a leap year)**

1 would be entered into the column titled “No. of Circuits removed”

.25 would be entered into the column titled “Equivalent Annual No. of Circuits Removed [3]” 91/366 = .25 **(2008 is a leap year)**

30 would be entered into the column titled “No. of Circuit Miles for Circuits Removed”

7.4 would be entered into the column titled “Equivalent Annual No. of Circuit Miles for Circuits Removed [3]”

30 Miles (91/366) = 7.4 **(2008 is a leap year)**

Calculation 3: Multi-Circuit Structure Miles for AC Circuits that were in-service at the end of the reporting year [FORM 3.1]

Multi-Circuit Structure Miles Calculations
(Elements at the end of the year)

Element Identification	Multi-Circuit Structure Miles
AB-1 & AB-2	25
AC & AE	10
CD-1 & CD-2	25
Total Structure Miles	60

60 would be entered into the column titled “Multi-Circuit Structure Miles (End of Year)”

Calculation 4: Multi-Circuit Structure Miles for AC Circuits that were added or removed during the reporting year [FORM 3.1]

Multi-Circuit Structure Miles Calculations
(Elements added during the year)

Element Identification	Multi-Circuit Structure Miles	Number of Days from In-Service date to the end of the reporting year	Equivalent Multi-Circuit Structure Miles
CD-1 & CD-2	25	205	14.04
Total Equivalent Structure Miles added during the year			14.04

25 would be entered into the column titled “Multi-Circuit Structure Miles for Circuits Added”

14.04 would be entered into the column titled “Equivalent Annual No. of Multi-Circuit Structure Miles for Circuits Added”

25 Structure Miles (205/366) = 14.04 **(2008 is a leap year)**

Two Questions in Form 3.1

Base Example:

None of Multi-Circuit Structure Miles are on a common structure reported by another Transmission Owner.

Transmission Owner Coordination Questions	1. Do any of the Multi-Circuit Structure Miles contain circuits on the common structures that are reported by you and another Transmission Owner(s)?	No
	2. If the answer to question 1 is "yes," have you and the other Transmission Owner(s) coordinated your reporting to insure that no double counting of Multi-Circuit Structure Miles are being reported for the circuits on these structures?	Not applicable

Situation 1:

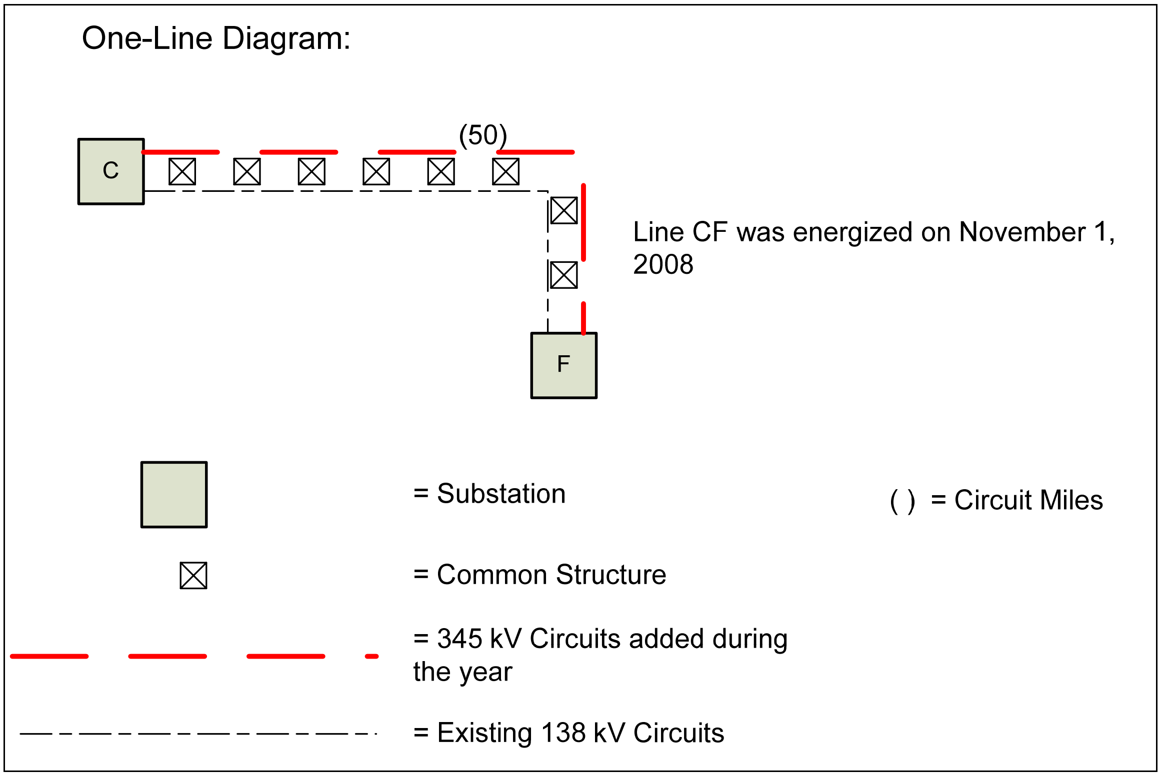


Figure 2: The addition of a TADS Element on a common structure with a non-TADS Element

In this situation AC Circuit CF was placed on a common structure with an existing 138 kV circuit. For TADS this common structure situation shall not be included in the Multi-Circuit Structure Mile calculation. For TADS you are only to report those Multi-Circuit Structure Miles where two or more TADS Elements share a common structure.

The calculations for AC Circuit CF are the same as in the Base Model.

Base Case and Situation 1 Inventory Data, Form 3.1

AC and DC Circuit Inventory Data

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
Row No.	Voltage Class [2]	No. of Circuits (End-of-Year)	Circuit Miles (End-of-Year)	No. of Circuits Added	Equivalent Annual No. of Circuits Added [3]	No. of Circuit Miles for Circuits Added	Equivalent Annual No. of Circuit Miles for Circuits Added [3]	No. of Circuits Removed	Equivalent Annual No. of Circuits Removed [3]	No. of Circuit Miles for Circuits Removed	Equivalent Annual No. of Circuit Miles for Circuits Removed [3]	CALCULATED Annual Equivalent No. of Circuits = B-D+E+I	CALCULATED Annual Eqivalent No. of Circuit Miles = C-F+G+K
1	200-299 kV AC Overhead	0.0		0.0				0.0				0.0	0.0
2	300-399 kV AC Overhead	11.0	345.0	4.0	1.6	170.0	62.3	2.0	0.8	105.0	50.9	9.4	288.2
3	400-499 kV AC Overhead	0.0		0.0				0.0				0.0	0.0
4	500-599 kV AC Overhead	0.0		0.0				0.0				0.0	0.0
5	600-799 kV AC Overhead	0.0		0.0				0.0				0.0	0.0

AC Muliti-Circuit Structure Miles Inventory Data

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
	Voltage Class [2]		Multi-Circuit Structure Miles (End-of-Year)			No. of Multi-Circuit Structure Miles for Circuits Added	Equivalent Annual No. of Multi-Circuit Structure Miles for Circuits Added [3]			No. of Multi-Circuit Structure Miles for Circuits Removed	Equivalent Annual No. of Multi-Circuit Structure Miles for Circuits Removed [3]		CALCULATED Annual Equivalent No. of Multi-Circuit Structure Miles = C-F+G+K
19	200-299 kV AC												
20	300-399 kV AC		60.0			25.0	14.0			0.0	0.0		49.0
21	400-599 kV AC												
22	600-799 kV AC												
23	Mixed Voltages [4]												

Situation 2:

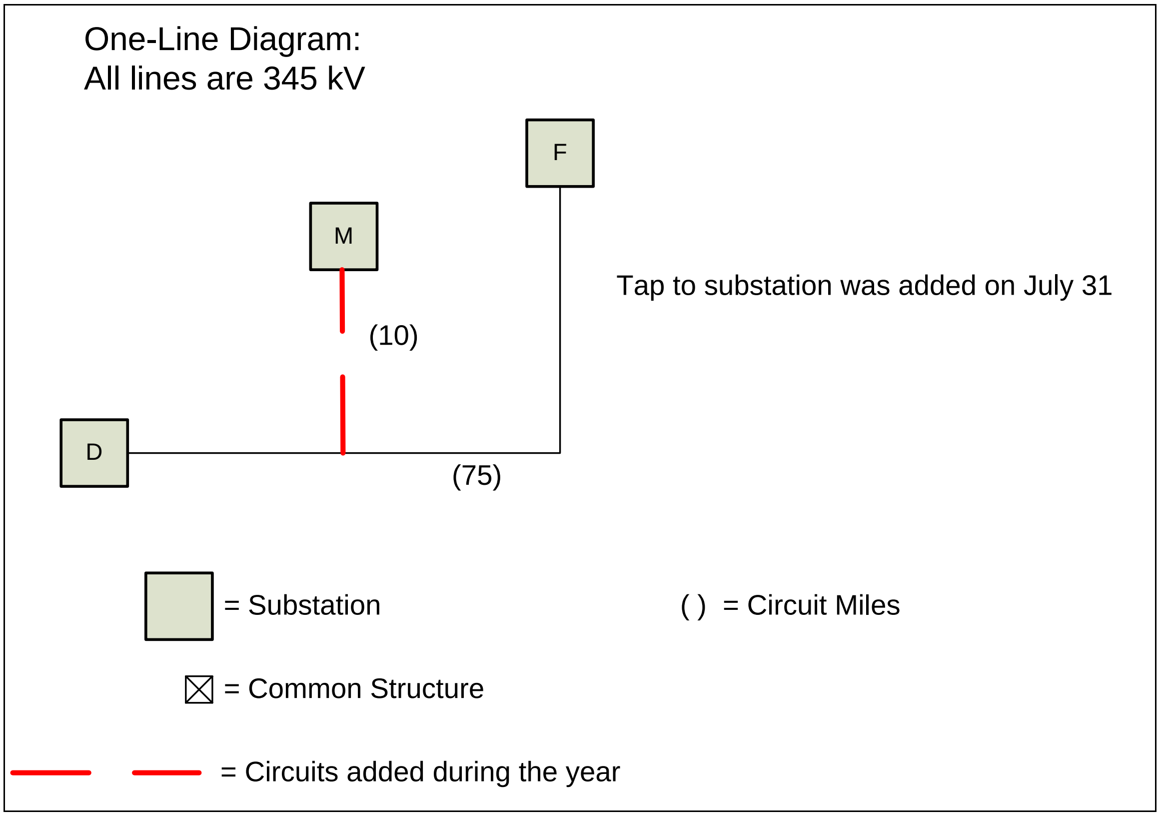


Figure 3: Tap addition

In this example we are demonstrating how to calculate your inventory data if, in addition to the work that was done in the Base Model, you added a 10 mile tap off AC Circuit DF.

Calculation 1a: No. of AC Circuits and Circuit Miles that were in-service at the end of the reporting year [FORM 3.1]

Circuit Miles calculations
(Elements at the end of the year)

Element Identification	Circuit Miles
AB-1	25
AB-2	25
BD-1	25
BD-2	25
AE	25
AC	25
CD-1	25
DMF	85
CD-2	25
CF	50
Total Circuit Miles	335

10 would be entered into the column titled "No. of Circuits (End of Year)"

335 would be entered into the column titled "Circuit miles (End of Year)"

Calculation 2a: No. of AC Circuits and Circuit Miles that were added or removed during the reporting year [FORM 3.1]

Circuit Miles Calculations
(Elements added, retired or changed during the year)

Element Identification	Circuit Miles	Number of days from in-service date through the end of the reporting year	Equivalent Annual Element Value	Equivalent Circuit Miles
CD-2	25	205	.56	14.04
CF	50	61	.17	8.36
DFM	85	154	.42	35.7
		Totals for Elements added	1.15	58.1
Element Identification	Circuit Miles	Number of days from retirement/change date to the beginning of the reporting year	Equivalent Annual Element Value	Equivalent Circuit Miles
CE	30	91	.25	7.4
DF	75	212	.58	43.5
		Total for Elements retired or changed	.83	50.9

3 would be entered into the column titled "No. of Circuits Added"
1.15 would be entered into the column titled "Equivalent Annual No. of Circuits Added [3]" *(Excel will display to the first significant digit)*

(205/366) + (61/366) + (154/366) = 1.15 **(2008 is a leap year)**

160 would be entered into the column titled "No. of Circuit Miles for Circuits Added"
58.1 would be entered into the column titled "Equivalent Annual No. of Circuit Miles for Circuits Added [3]"

25 Miles (205/366) + 50 Miles (61/366) + 85 Miles (154/366) = 58.1
(2008 is a leap year)

2 would be entered into the column titled "No. of Circuits removed"
.83 would be entered into the column titled "Equivalent Annual No. of Circuits Removed [3]" (91/366) + (212/366) = .83 **(2008 is a leap year)**
105 would be entered into the column titled "No. of Circuit Miles for Circuits Removed"
50.9 would be entered into the column titled "Equivalent Annual No. of Circuit Miles for Circuits Removed [3]"

30 Miles (91/366) + 75 Miles (212/366) = 50.9 **(2008 is a leap year)**

Calculation 3a: Multi-Circuit Structure Miles for AC Circuits that were in-service at the end of the reporting year [FORM 3.1]

This calculation is the same as in the Base Model.

Calculation 4a: Multi-Circuit Structure Miles for AC Circuits that were added or removed during the reporting year. [FORM 3.1]

This calculation is the same as in the Base Model.

Situation 2 Inventory Data, Form 3.1

	AC and DC Circuit Inventory Data												
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
Row No.	Voltage Class [2]	No. of Circuits (End-of-Year)	Circuit Miles (End-of-Year)	No. of Circuits Added	Equivalent Annual No. of Circuits Added [3]	No. of Circuit Miles for Circuits Added	Equivalent Annual No. of Circuit Miles for Circuits Added [3]	No. of Circuits Removed	Equivalent Annual No. of Circuits Removed [3]	No. of Circuit Miles for Circuits Removed	Equivalent Annual No. of Circuit Miles for Circuits Removed [3]	CALCULATED Annual Equivalent No. of Circuits = B-D+E+I	CALCULATED Annual Equivalent No. of Circuit Miles = C-F+G+K
1	200-299 kV AC Overhead												
2	300-399 kV AC Overhead	10	335.0	3	1.20	160.0	58.1	1	0.83	105.0	50.9	9.0	284.0
3	400-599 kV AC Overhead												
4	600-799 kV AC Overhead												

Multi-Circuit Structure Miles data is the same as the Base Case

Situation 3:

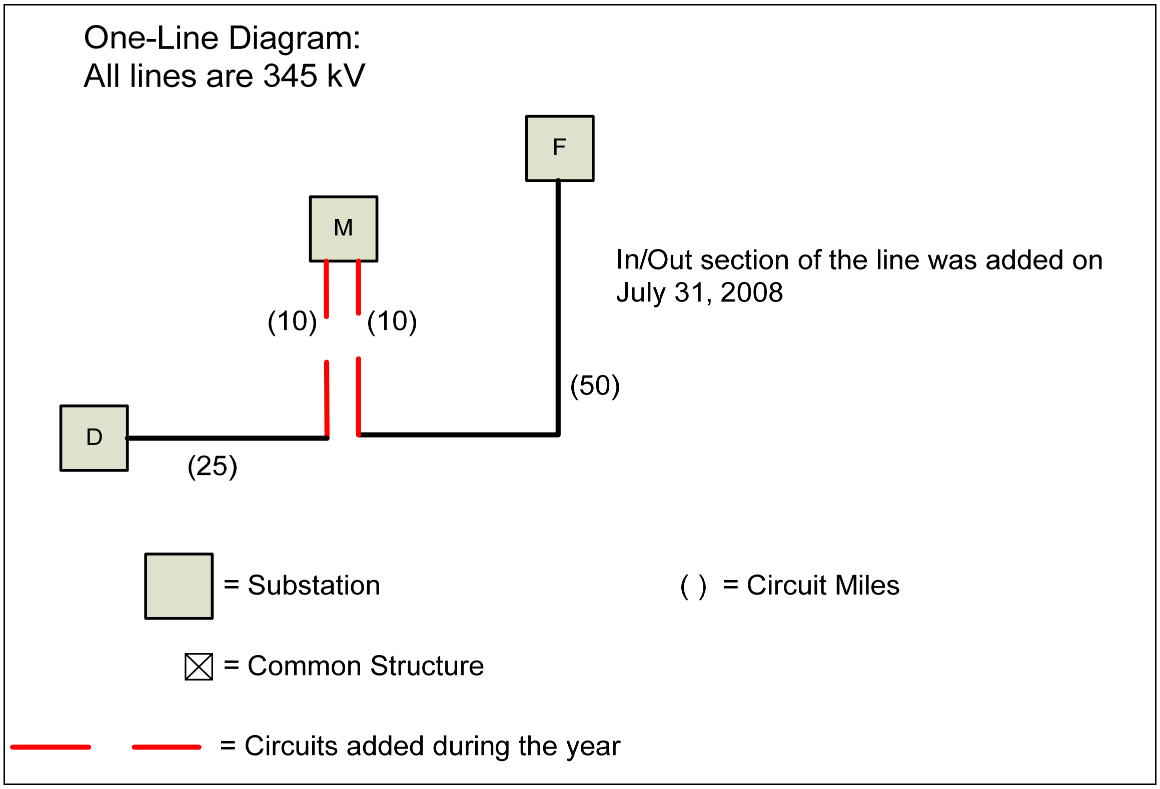


Figure 4: In/Out section addition

In this example we are demonstrating how to calculate your inventory data if, in addition to the work that was done in the Base Model, you added two 10-mile sections for a new substation.

Calculation 1b: No. of AC Circuits and Circuit Miles that were in-service at the end of the reporting year [FORM 3.1]

Circuit Miles calculations
(Elements at the end of the year)

Element Identification	Circuit Miles
AB-1	25
AB-2	25
BD-1	25
BD-2	25
AE	25
AC	25
CD-1	25
DM	35
MF	60
CD-2	25
CF	50
Total Circuit Miles	345

11 would be entered into the column titled "No. of Circuits (End of Year)"
345 would be entered into the column titled "Circuit miles (End of Year)"

Calculation 2b: No. of AC Circuits and Circuit Miles that were added or removed during the reporting year [FORM 3.1]

Circuit Miles Calculations
(Elements added, retired or changed during the year)

Element Identification	Circuit Miles	Number of days from in-service date through the end of the reporting year	Equivalent Annual Element Value	Equivalent Circuit Miles
CD-2	25	205	.56	14.04
CF	50	61	.17	8.36
DM	35	154	.42	14.7
MF	60	154	.42	25.2
		Totals for Elements added	1.57	62.3
Element Identification	Circuit Miles	Number of days from retirement/change date to the beginning of the reporting year	Equivalent Annual Element Value	Equivalent Circuit Miles
CE	30	91	.25	7.4
DF	75	212	.58	43.5
		Total for Elements retired or changed	.83	50.9

4 would be entered into the column titled "No. of Circuits Added"
1.57 would be entered into the column titled "Equivalent Annual No. of Circuits Added [3]" (205/366) + (61/366) + (154/366) + (154/366) = 1.57 **(2008 is a leap year)**
170 would be entered into the column titled "No. of Circuit Miles for Circuits Added"
62.3 would be entered into the column titled "Equivalent Annual No. of Circuit Miles for Circuits Added [3]"

25 Miles (205/366) + 50 Miles (61/366) + 35 Miles (154/366) + 60 Miles (154/366) = 62.3 **(2008 is a leap year)**

2 would be entered into the column titled "No. of Circuits removed"
.83 would be entered into the column titled "Equivalent Annual No. of Circuits Removed [3]" (91/366) + (212/366) = .83 **(2008 is a leap year)**
105 would be entered into the column titled "No. of Circuit Miles for Circuits Removed"
50.9 would be entered into the column titled "Equivalent Annual No. of Circuit Miles for Circuits Removed [3]"

30 Miles (91/366) + 75 Miles (212/366) = 50.9 **(2008 is a leap year)**

Calculation 3b: Multi-Circuit Structure Miles for AC Circuits that were in-service at the end of the reporting year [FORM 3.1]

This calculation is the same as in the Base Model.

Calculation 4b: Multi-Circuit Structure Miles for AC Circuits that were added or removed during the reporting year [FORM 3.1]

This calculation is the same as in the Base Model.

Situation 3 Inventory Data, Form 3.1

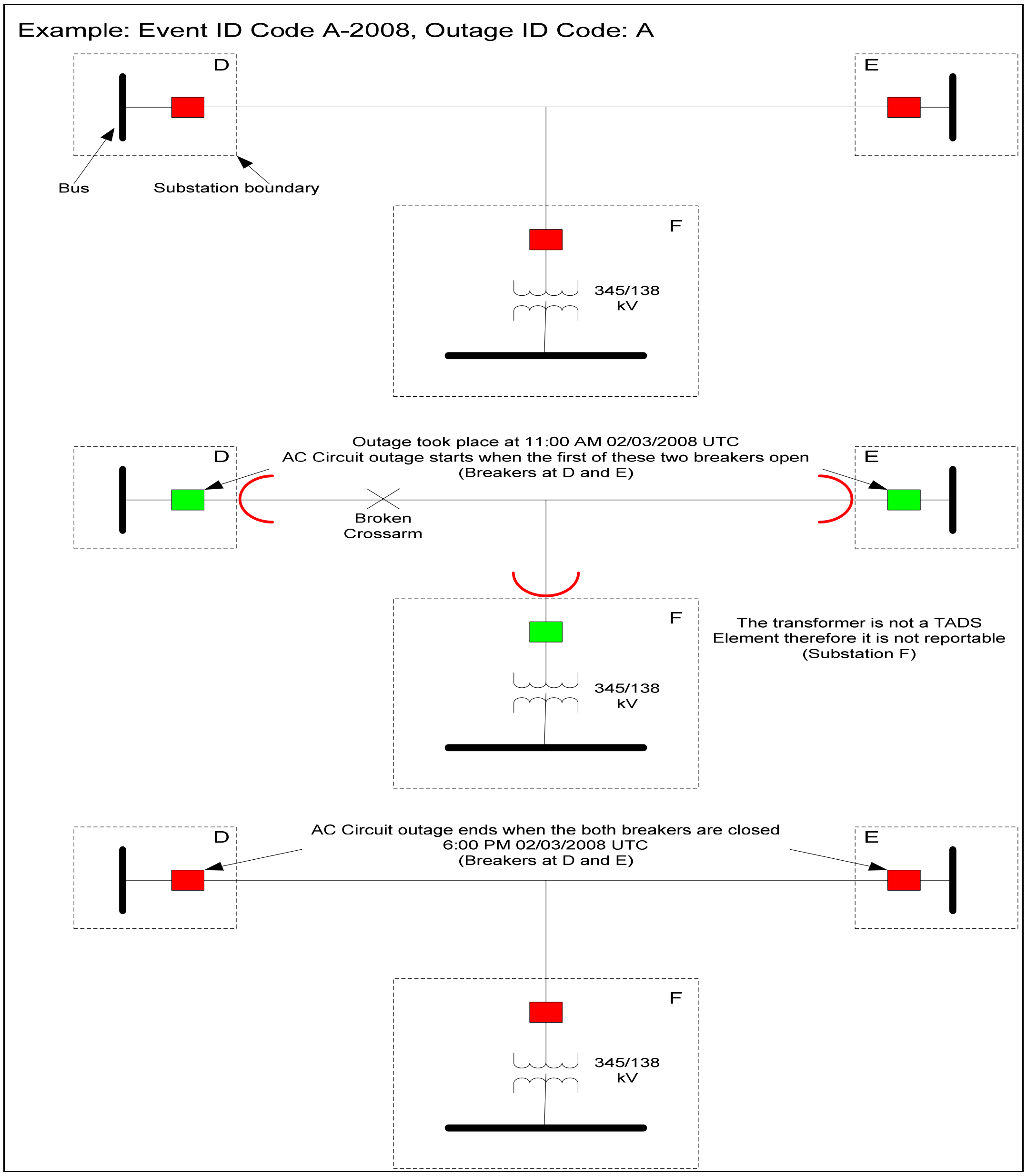
	AC and DC Circuit Inventory Data												
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
Row No.	Voltage Class [2]	No. of Circuits (End-of-Year)	Circuit Miles (End-of-Year)	No. of Circuits Added	Equivalent Annual No. of Circuits Added [3]	No. of Circuit Miles for Circuits Added	Equivalent Annual No. of Circuit Miles for Circuits Added [3]	No. of Circuits Removed	Equivalent Annual No. of Circuits Removed [3]	No. of Circuit Miles for Circuits Removed	Equivalent Annual No. of Circuit Miles for Circuits Removed [3]	CALCULATED Annual Equivalent No. of Circuits = B-D+E+I	CALCULATED Annual Equivalent No. of Circuit Miles = C-F+G+K
1	200-299 kV AC Overhead												
2	300-399 kV AC Overhead	11.0	345.0	4.0	1.6	170.0	62.3	2.0	0.8	105.0	50.9	9.4	288.2
3	400-599 kV AC Overhead												
4	600-799 kV AC Overhead												

Multi-Circuit Structure Miles data is the same as the Base Case

Appendix 9 Detailed Automatic Outage Data Examples

The following examples illustrate several AC Circuit and Transformer outage scenarios and the applicable detailed outage data for each scenario. While not all possible situations could be covered, the examples are complete enough to help with outage interpretation.

Three-terminal AC Circuit with a non-TADS Element



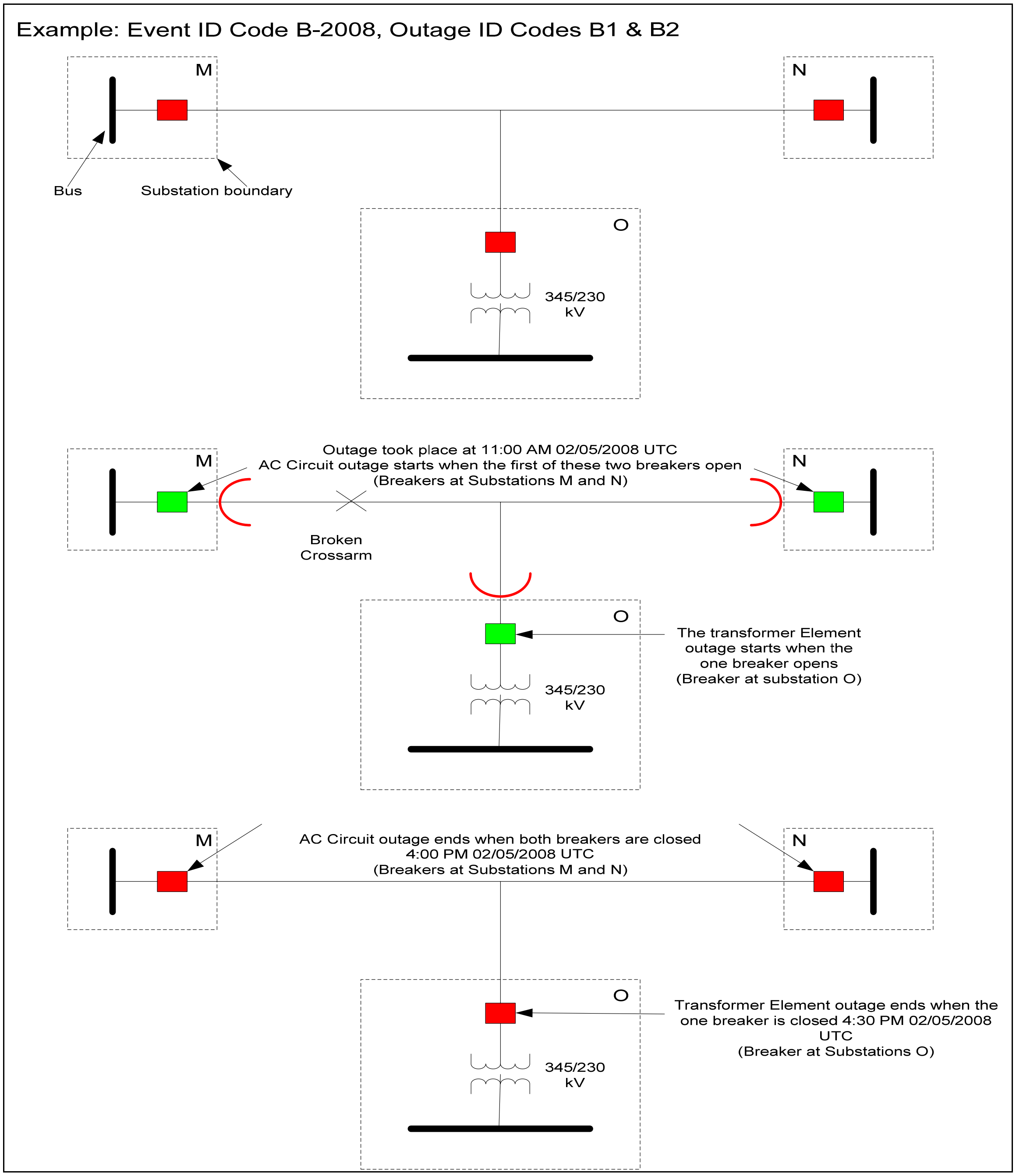
A three terminal AC Circuit with a non-TADS Element attached to one of the segments. The non-TADS Element is the 345/138 kV transformer.

Since the transformer is not a TADS Element outages to the transformer are not reportable.

Outage Mode: Single Mode Outage

This is a Single Mode Outage because the 345/138 kV transformer is not a TADS Element.

Three-terminal AC Circuit with a TADS Element



A three terminal AC Circuit with a TADS Transformer attached to one of the segments.

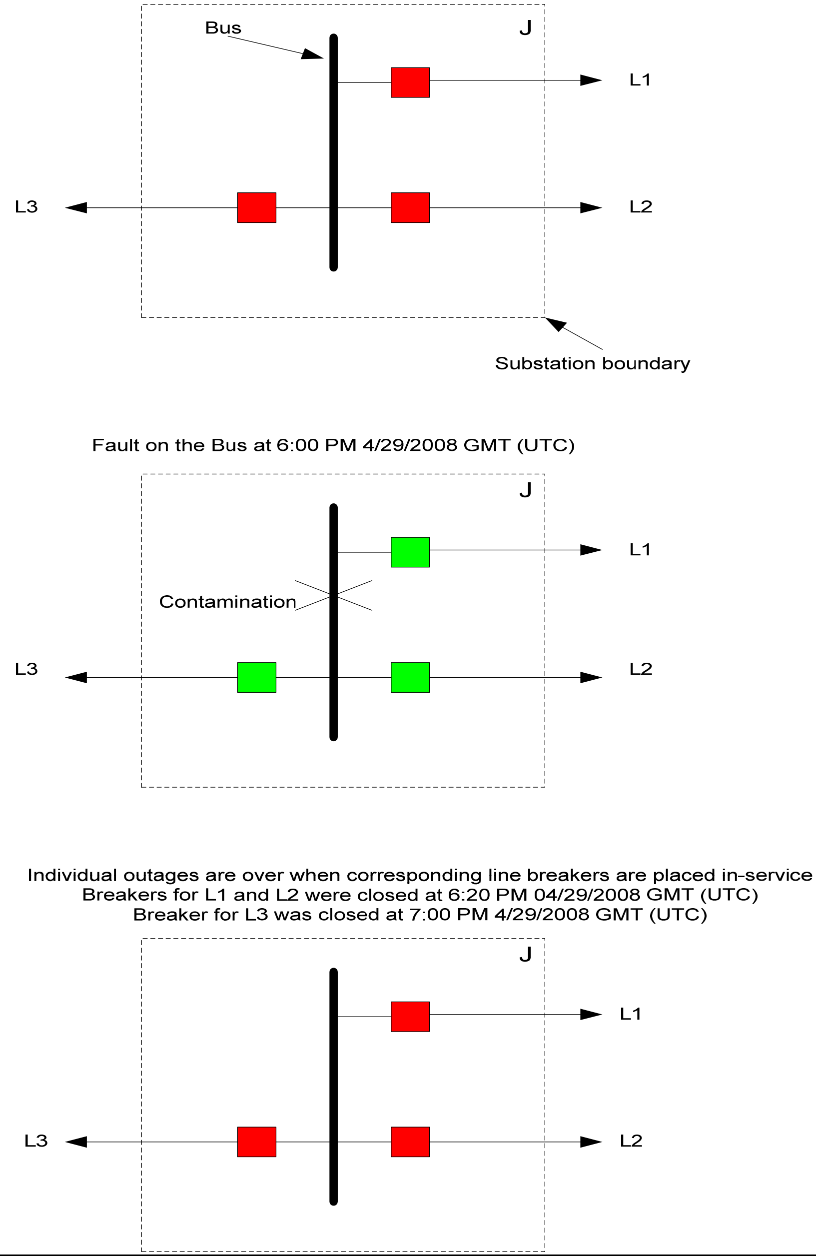
Since the transformer is a TADS Element outages to the transformer are reportable.

Outage Mode: Dependent Mode Initiating Outage (For the AC Circuit)
Outage Mode: Dependent Mode Outage (For the Transformer)

This is a Dependent Mode because the outage of the transformer is dependent on the outage of the AC Circuit.

Bus fault that interrupts TADS Elements

Example: Event ID Code C-2008, Outage ID Codes, C1, C2 and C3

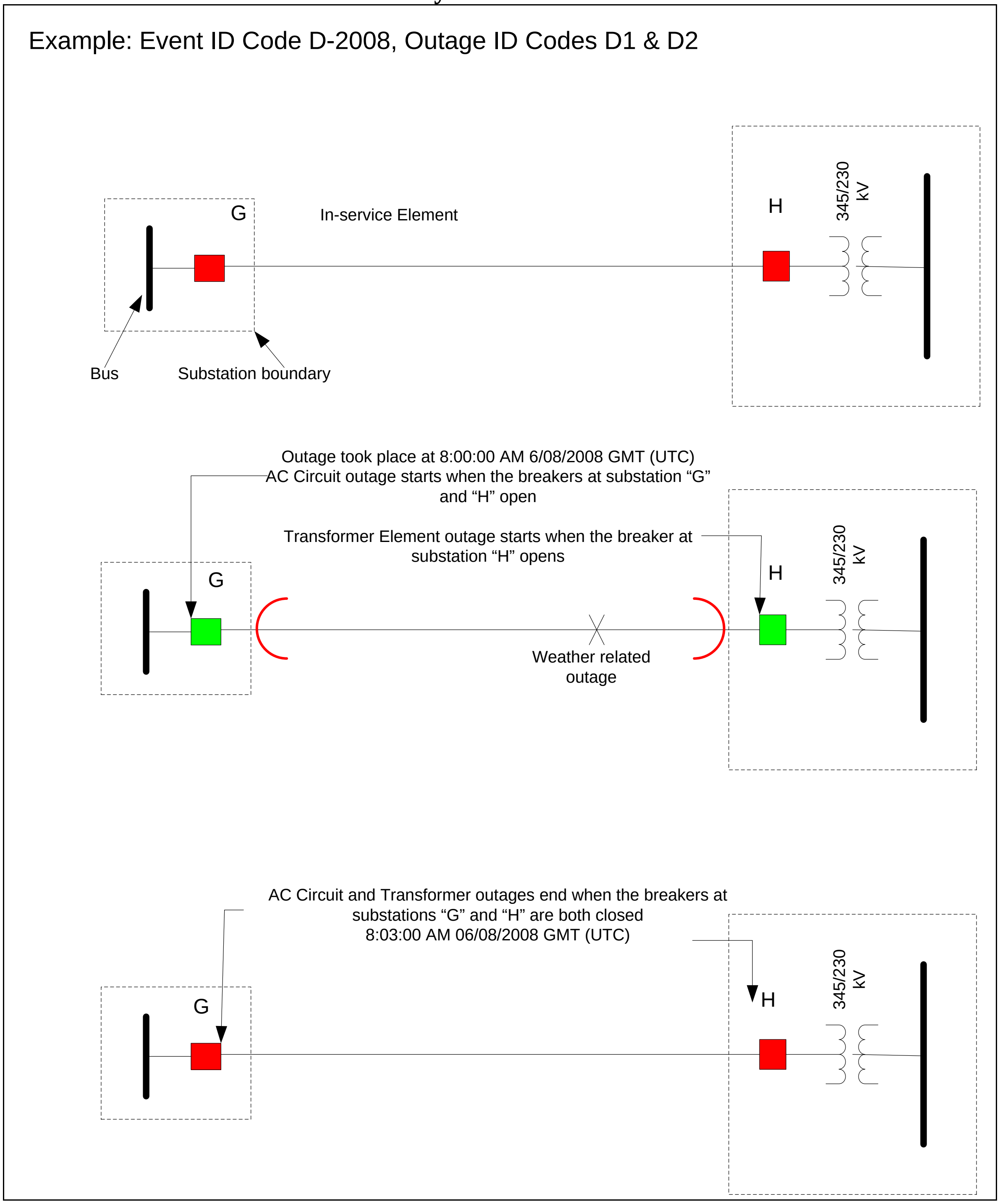


An outage of a 345 kV straight bus: An outage to any of the AC Circuits connected to the bus is reportable.

Outage Mode: Common Mode Outage

These are Common Mode Outages because the outages are not the consequence of any single TADS Element.

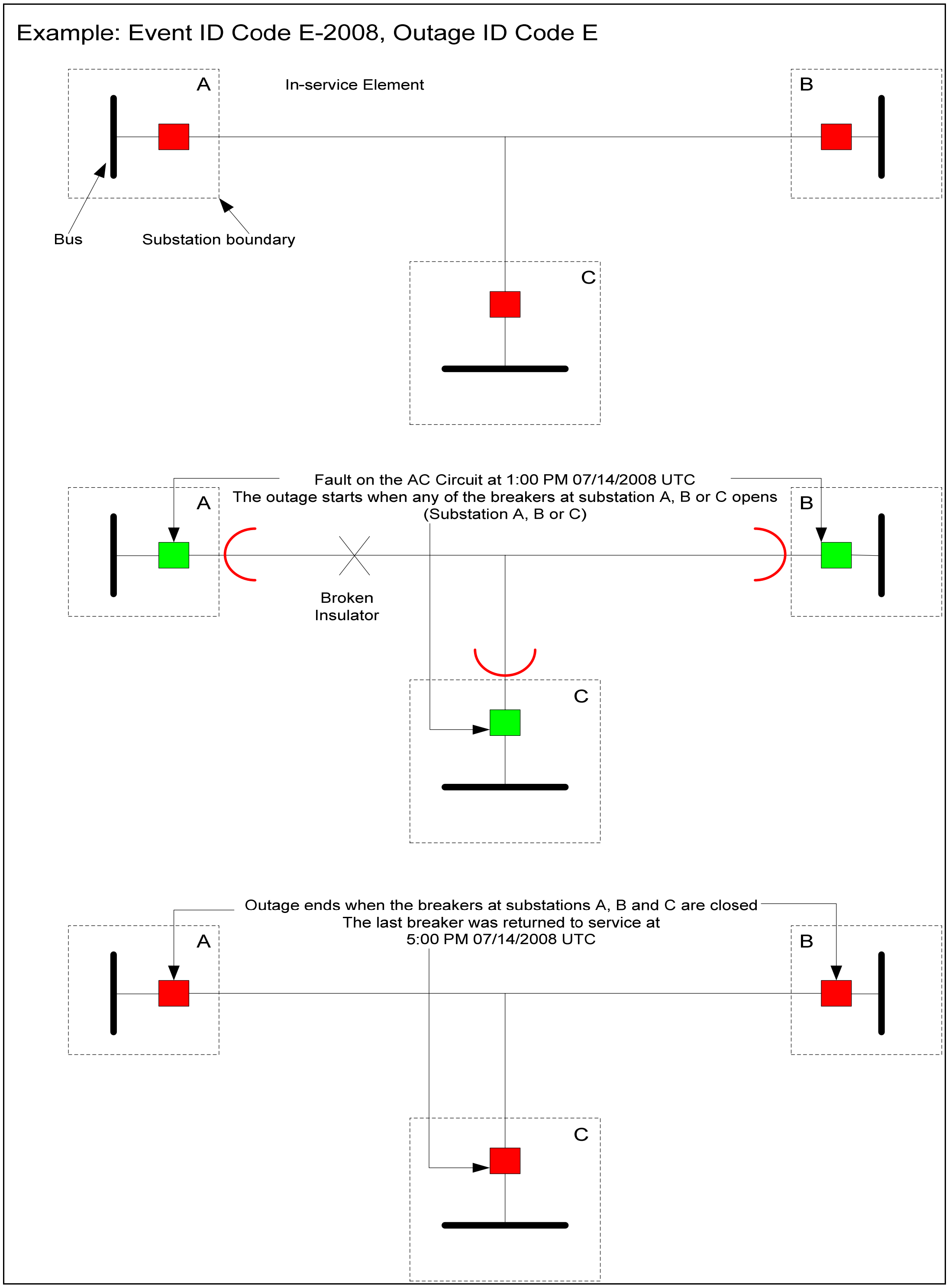
AC Circuit that is directly connected to a TADS Transformer



Outage Mode: Dependent Mode Initiating Outage (For the AC Circuit)
Outage Mode: Dependent Mode Outage (For the Transformer)

This is a Dependent Mode Outage because the outage of the transformer is due to the outage of the AC Circuit.

Three-terminal AC Circuit

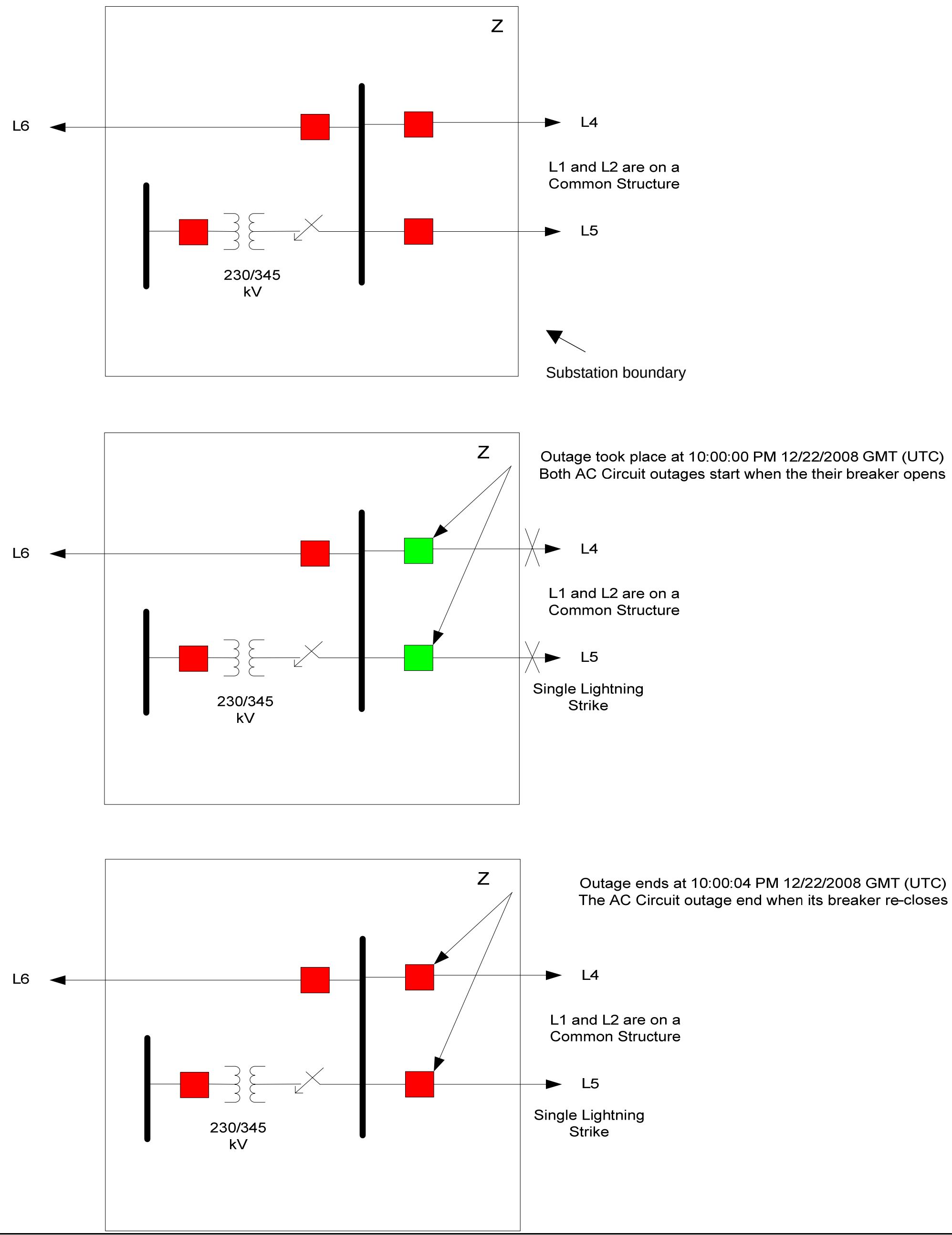


Outage Mode: Single Mode Outage

No other TADS Elements were impacted with this outage.

Common cause outage to two AC Circuits

Example: Event ID Code F-2008, Outage ID Code F1 & F2



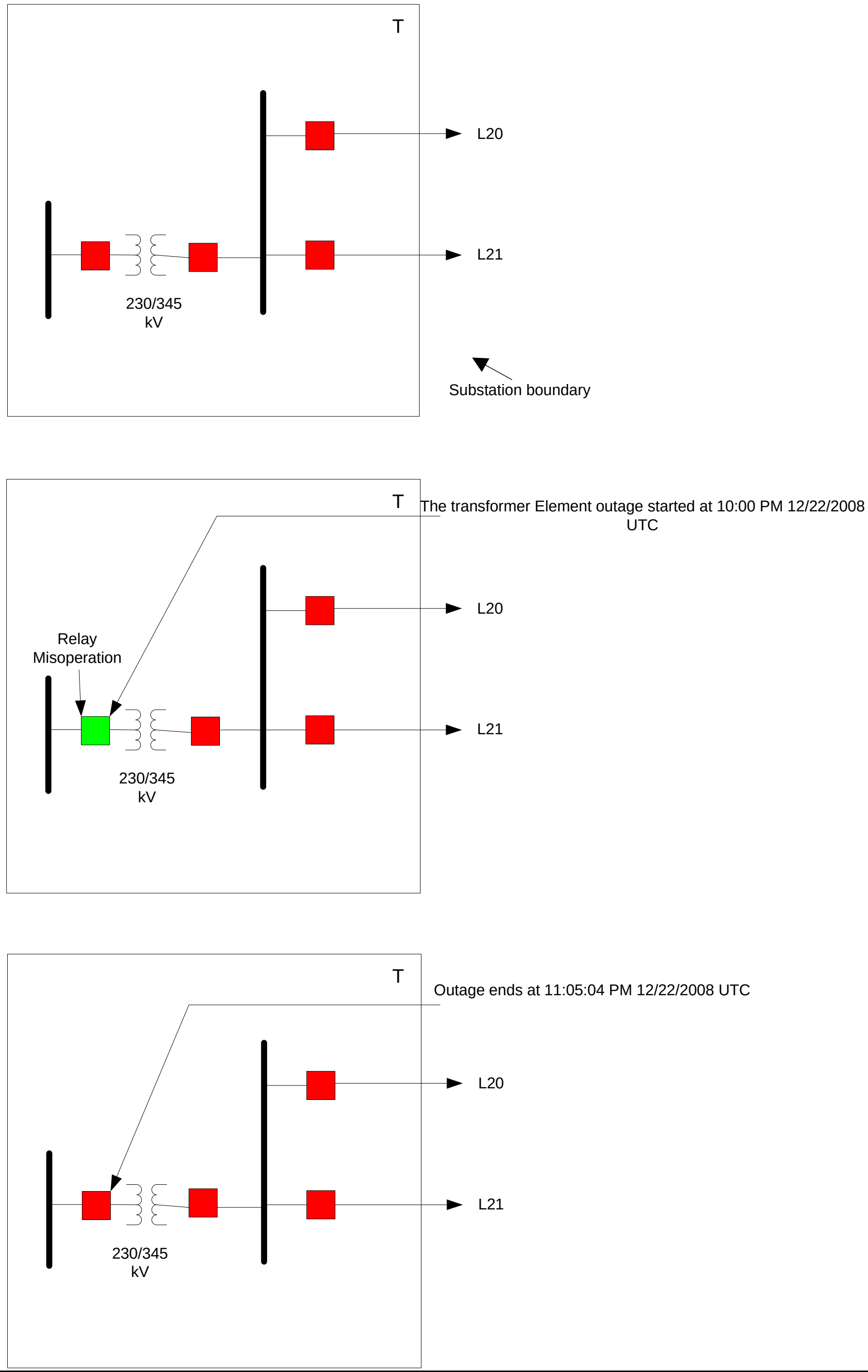
Outage Mode: Common Mode Outage

A single lightning strike cause both lines to open. The outage on either TADS Element was not a consequence of each other.

Note: The outage would have been characterized as a Common Mode Outage even if the AC Circuits had not been on common structures.

Transformer outage

Example: Event ID Code G-2008, Outage ID Code G

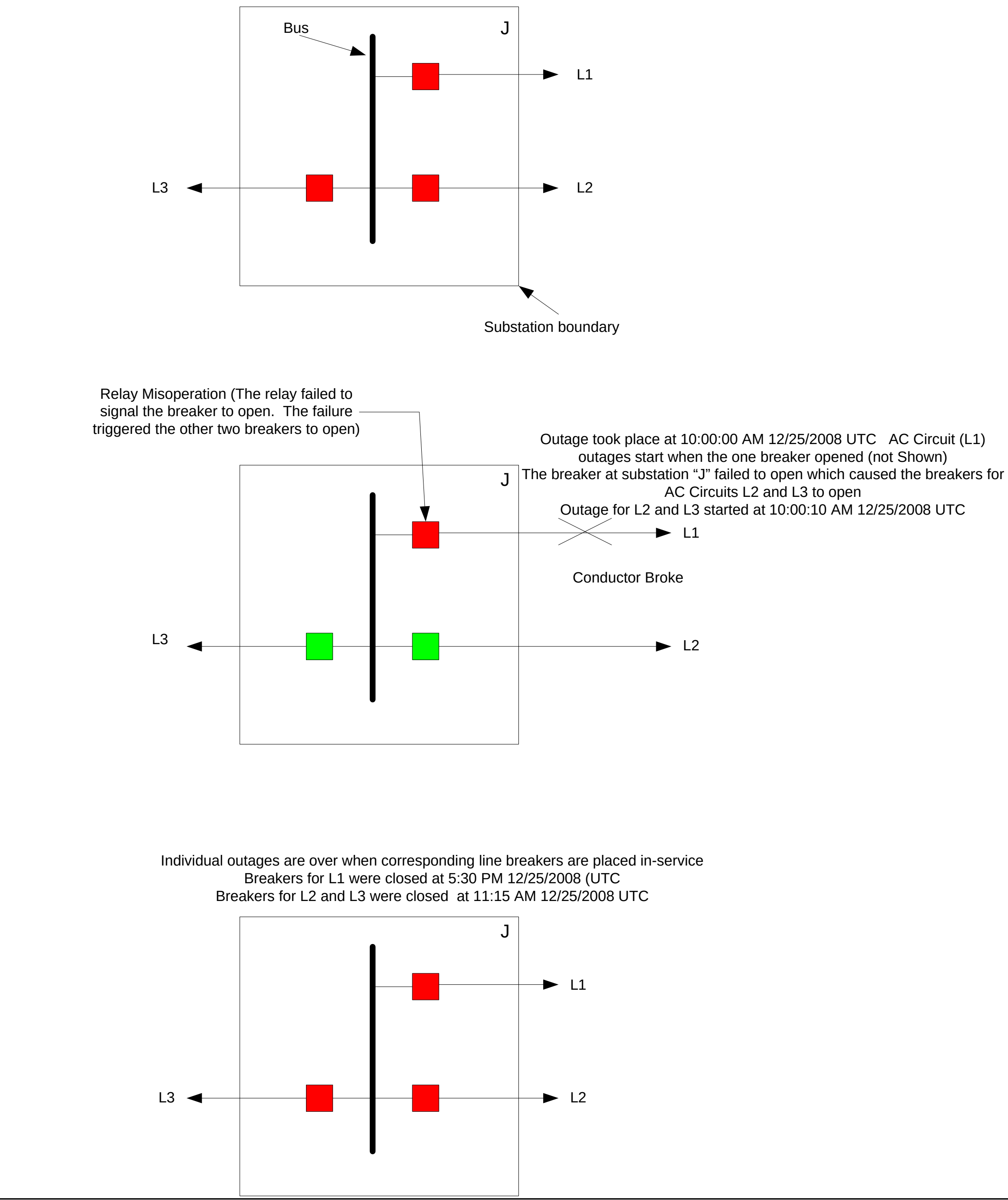


Outage Mode: Single Mode Outage

No other TADS Elements were outage because of the relay misoperation.

AC Circuit outage with a breaker failure

Example: Event ID Code H-2008, Outage ID Code H1, H2 & H3



Outage Mode: Dependent Mode Initiating Outage (For L1)
Outage Mode: Dependent Mode Outage (For L2 and L3)

The outages on AC Circuits L2 and L3 were due to the relay misoperation for the breaker on L1. If the breaker for L1 had not failed the breakers for L3 and L2 would not have opened.

Form 4.1 AC Circuit Detailed Automatic Outage Data

AC Circuit Momentary and Sustained Outage Data								
			Circuit Substation Boundaries					
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Outage ID Code	Event ID Code [2]	Voltage Class	AC Substation Name #1	AC Substation Name #2	AC Substation Name #3	TO Element Identifier (AC Circuit)	OH or UG?	AC Multi-Owner Com. Struct. Flag [3]
A	A-2008	300-399 kV	D	E	F	345-DEF	OH	0
B1	B-2008	300-399 kV	M	N	O	345-MNO	OH	0
C1	C-2008	300-399 kV	J	K		345-JK	OH	0
C2	C-2008	300-399 kV	J	Q		345-JQ	OH	0
C3	C-2008	300-399 kV	J	X		3345-JX	OH	0
D1	D-2008	300-399 kV	G	H		345-GH	OH	0
E	E-2008	300-399 kV	A	B	C	345-ABC	OH	0
F1	F-2008	300-399 kV	Z	W		345-ZW	OH	0
F2	F-2008	300-399 kV	Z	Y		345-ZY	OH	0
H1	H-2008	300-399 kV	J	K		345-JK	OH	0
H2	H-2008	300-399 kV	J	Q		345-JQ	OH	0
H3	H-2008	300-399 kV	J	X		3345-JX	OH	0

Continued…

	AC Circuit Momentary and Sustained Outage Data							
					Cause Codes			
(A)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
Outage ID Code	Fault Type	Outage Initiation Code	Start Time (mm/dd/yyyy hh:mm) (UTC) [4]	Outage Duration hhhh:mm [5]	Initiating Cause Code [6]	Sustained Cause Code [7]	Outage Mode	Outage Continuation Code [8]
A	Single P-G fault	Element-Initiated	2/3/2008 11:00	7:00	Failed AC Circuit Equipment	Failed AC Circuit Equipment	Single Mode	0
B1	Single P-G fault	Element-Initiated	2/5/2008 11:00	5:00	Failed AC Circuit Equipment	Failed AC Circuit Equipment	Dependent Mode Initiating	0
C1	Single P-G fault	AC Substation-Initiated	4/29/2008 18:00	0:20	Contamination	Contamination	Common Mode	0
C2	Single P-G fault	AC Substation-Initiated	4/29/2008 18:00	0:20	Contamination	Contamination	Common Mode	0
C3	Single P-G fault	AC Substation-Initiated	4/29/2008 18:00	1:00	Contamination	Contamination	Common Mode	0
D1	P-P fault	Element-Initiated	6/8/2008 8:00	0:03	Weather, excluding lightning	Weather, excluding lightning	Dependent Mode Initiating	0
E	P-P fault	Element-Initiated	7/14/2008 13:00	4:00	Failed AC Circuit Equipment	Failed AC Circuit Equipment	Single Mode	0
F1	Single P-G fault	Element-Initiated	12/22/2008 22:00	0:00	Lightning	NA- Momentary	Common Mode	0
F2	Single P-G fault	Element-Initiated	12/22/2008 22:00	0:00	Lightning	NA- Momentary	Common Mode	0
H1	P-P fault	Element-Initiated	12/25/2008 10:00	7:30	Failed AC Circuit Equipment	Failed AC Circuit Equipment	Dependent Mode Initiating	0
H2	P-P fault	Other Facility-Initiated	12/25/2008 10:00	1:15	Failed Protection System Equipment	Failed Protection System Equipment	Dependent Mode	0
H3	P-P fault	Other Facility-Initiated	12/25/2008 10:00	1:15	Failed Protection System Equipment	Failed Protection System Equipment	Dependent Mode	0

Form 4.3 Transformer Detailed Automatic Outage Data

Transformer Momentary and Sustained Outage Data							
(A)	(B)	(C)	(D)	(G)	(J)	(K)	(L)
Outage ID Code	Event ID Code [2]	High-Side Voltage Class	Located at (AC Sub. Name)	TO Element Identifier (Transformer)	Fault Type	Outage Initiation Code	Start Time (mm/dd/yyyy hh:mm) (UTC) [3]
B2	B-2008	300-399 kV	O	xtrm #1-O	No fault	Other Element-Initiated	2/5/2008 11:00
D2	D-2008	300-399 kV	H	xtrm #1-H	No fault	Other Element-Initiated	6/8/2008 8:00
G	G-2008	300-399 kV	T	xtrm #1-T	No fault	Other Facility-Initiated	12/22/2008 22:00

	Transformer Momentary and Sustained Outage Data				
		Cause Codes			
(A)	(M)	(N)	(O)	(P)	(Q)
Outage ID Code	Outage Duration hhhh:mm [4]	Initiating Cause Code [5]	Sustained Cause Code [6]	Outage Mode	Outage Continuation Code [7]
B2	5:30	Failed AC Circuit Equipment	Failed AC Circuit Equipment	Dependent Mode	0
D2	0:03	Weather, excluding lightning	Weather, excluding lightning	Dependent Mode	0
G	1:05	Failed Protection System Equipment	Failed Protection System Equipment	Single Mode	0

Form 5 Event ID Code

Event Type No.	Table 1 Category from the TPL Standards	Description	
10	B	Automatic Outage of an AC Circuit or Transformer with Normal Clearing.	
20	B	Automatic Outage of a DC Circuit with Normal Clearing.	
30	C	Automatic Outage of two ADJACENT AC Circuits on common structures with Normal	
40	C	Automatic Outage of two ADJACENT DC Circuits on the common structures with Normal	
50	NA	Other - please describe the event (optional)	

Event ID Code Data

(A)	(B)		(D)
Event ID Code [2]	**Event Type No. [3]**	**Description of the Event (optional) [4]**	**Disturbance Report Filed [5]**
A-2008	10		No
B-2008	50	Outage of Transmission Line and Transformer	No
C-2008	50	Bus Outage	No
D-2008	50	Outage of Transmission Line and Transformer	No
E-2008	10		No
F-2008	30		No
G-2008	10		No
H-2008	50	Fault on a Transmission Line followed by a system protection failure	No

Please comment on this entire Appendix 10

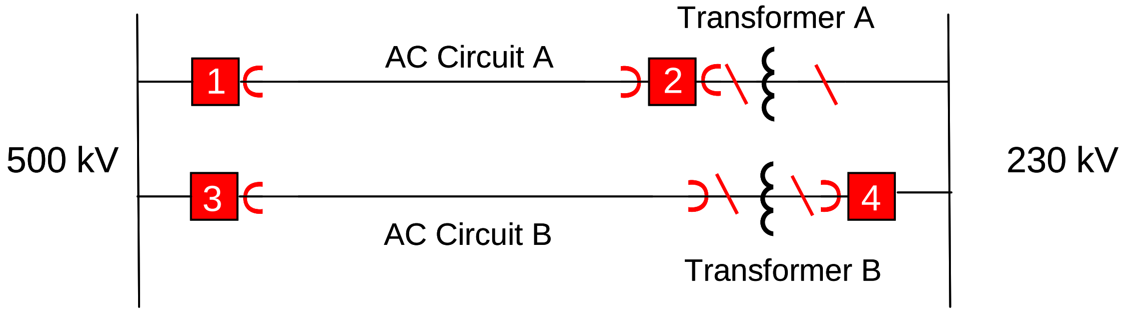
Appendix 10 Planned Outages and the 30-Minute Exclusion Examples

The definition of Planned Outage (Appendix 7, section B) states that "[Planned] Outages of TADS Elements of 30 minutes or less duration resulting from switching steps or sequences that are performed in preparation or restoration of an outage of another TADS Element are not reportable." The examples which follow illustrate the exclusion of such outages.

Example 1

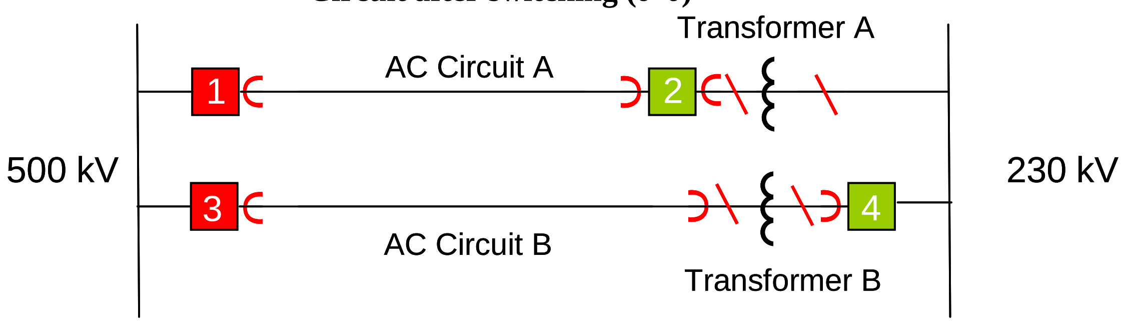
In the circuit below, the TO performs a Planned Outage for Transformer A. The circuit prior to any switching is shown in Figure 10-1

Figure 10-1
Circuit prior to any switching



To isolate Transformer A, the TO first opens breakers 2 and 4. The opening of these breakers begins outages of three Elements: AC Circuit A, Transformer A, and Transformer B. The circuit at t=0 just after the switching is shown below in Figure 10-2. We assume the breakers are opened nearly simultaneously, so the three Element outages commence at t=0.

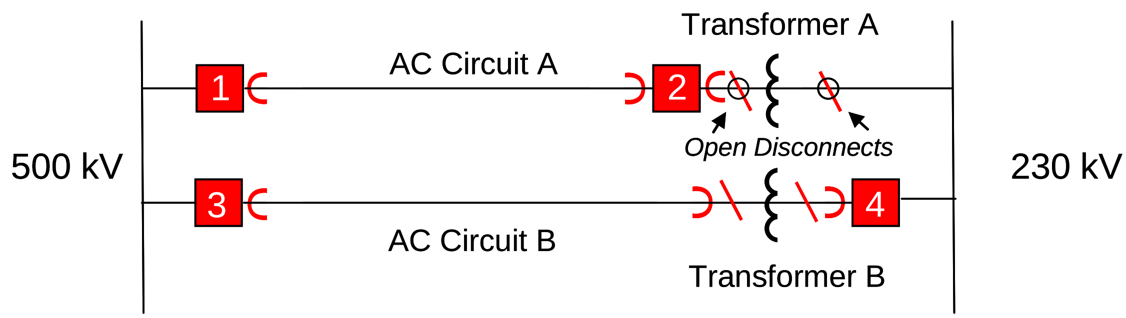
Figure 10-2
Circuit after switching (t=0)



Please comment on this entire Appendix 10

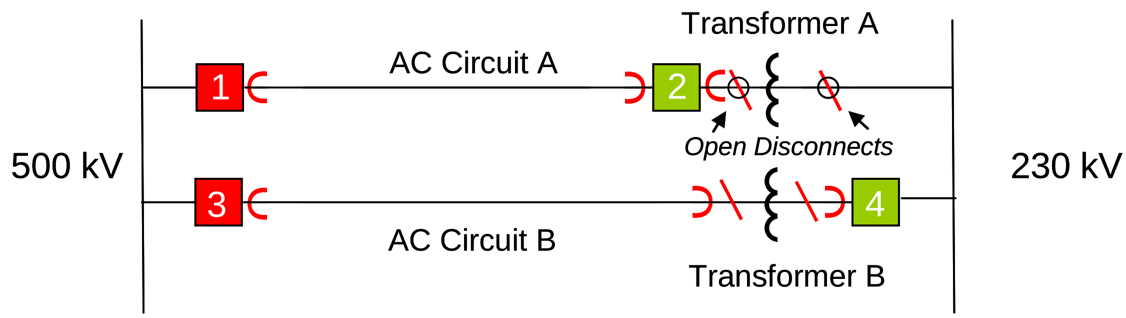
After 10 minutes, the two disconnect switches (one on the 500 kV side and the other on the 230 kV side) are opened, and breakers 2 and 4 are closed. Transformer A is still out of service, while AC Circuit A and Transformer B are back in service, having endured a Planned Outage of 10 minutes.

Figure 10-3
Circuit after switching (t=10 min.)



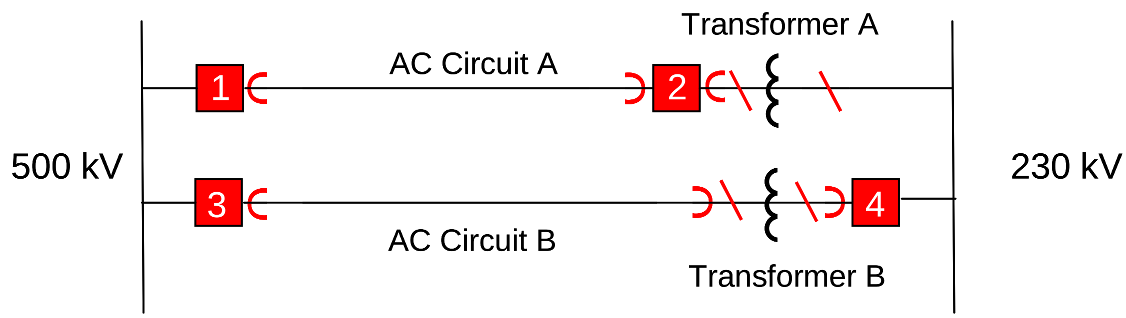
At this point, maintenance commences on Transformer A, and after two hours, Transformer A is ready to be placed back in-service. At time t = 2 hours and 10 minutes, breakers 2 and 4 are opened, and AC Circuit A and Transformer B experience another outage that commences at t= 2 hours and 10 minutes.

Figure 10-4
Circuit after switching (t=2 hr. 10 min.)



After 25 additional minutes lapse, the TO has closed the open disconnect switches and closed breakers 2 and 4. All circuit Elements are back in service. The configuration in Figure 10-5 is the same configuration of Figure 10-1.

Figure 10-5
Circuit after switching (t=2 hr. 35 min.)



Please comment on this entire Appendix 10

The table below summarizes each Element's Outage Duration.

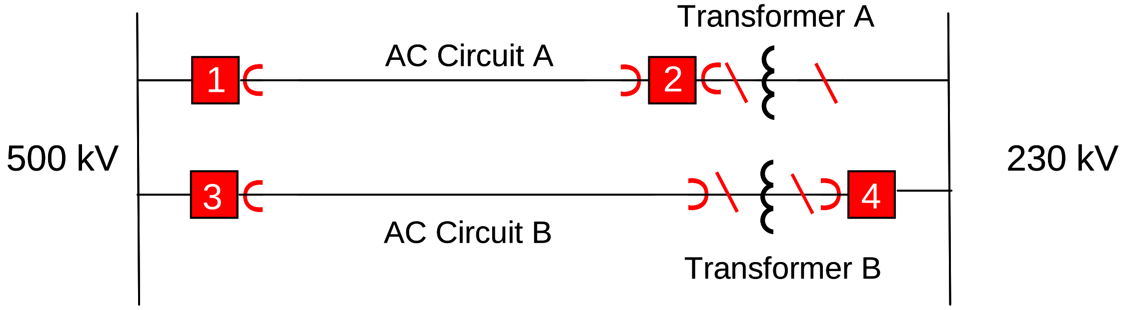
Element	Outage Start Time	Outage End Time	Outage Duration
Transformer A	t=0	t= 2 hr. 35 min	2 hr. 35 min.
AC Circuit A	t=0	t= 10 min.	10 min.
Transformer B	t=0	t= 10 min.	10 min.
AC Circuit A	t=2 hr. 10	t= 2 hr. 35 min.	25 min.
Transformer B	t=2 hr. 10	t= 2 hr. 35 min.	25 min.

Because the two outages experienced by AC Circuit A and Transformer B are each 30 minutes or less, they are not reported as part of the 30-minute exclusion.

Example 2

In the circuit below, the TO performs a Planned Outage for Transformer B. The circuit prior to any switching is shown in Figure 10-5

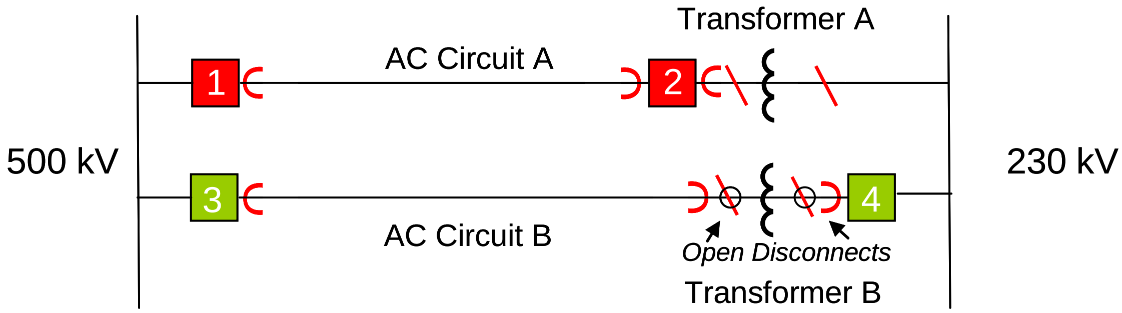
Figure 10-5
Circuit prior to any switching



To isolate Transformer B, the TO opens breakers 3 and 4. The opening of these breakers begins the outage of two Elements: AC Circuit B and Transformer B. We open the disconnect switches on Transformer B for safety in case either breaker 3 or 4 are accidently closed.

The circuit at t=0 just after the switching is shown below n Figure 10-6. We assume the breakers and disconnect switches are opened nearly simultaneously, so the two Element outages commence at t=0.

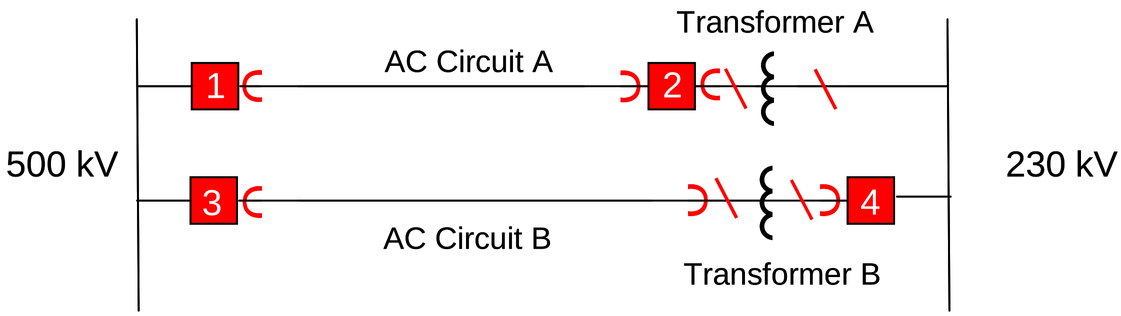
Figure 10-6
Circuit after switching (t=0)



Please comment on this entire Appendix 10

After 3 hours and 10 minutes, the maintenance is completed and the disconnect switches are closed and breakers 3 and 4 are returned to service. The configuration in Figure 10-7 is the same configuration of Figure 10-5.

Figure 10-7
Circuit after switching (t=3 hr. 10 min.)



The table below summarizes each Element's Outage Duration.

Element	Outage Start Time	Outage End Time	Outage Duration
Transformer B	t=0	t= 3 hr. 10 min.	3 hr. 10 min.
AC Circuit B	t=0	t= 3 hr. 10 min.	3 hr. 10 min.

Because AC Circuit B was out for greater than 30 minutes, its outage is not excluded. It is assigned the same Planned Outage Cause Code as Transformer B which had the intended outage.

Example 2A

Assume that the Transformer B outage in Example 2 was only 25 minutes in duration instead of 3 hours and 10 minutes. The table below summarizes each Element's Outage Duration for this shorter outage time.

Element	Outage Start Time	Outage End Time	Outage Duration
Transformer B	t=0	t= 25 min.	25 min.
AC Circuit B	t=0	t= 25 min.	25 min.

While the outage of Transformer B is reported since it was the Element that had the Planned Outage, because AC Circuit B was out for 25 minutes, which is "30 minutes or less," its outage is excluded from reporting.

Appendix 11 Regional Entity and NERC Contacts

Regional Entity contacts:

Florida Reliability Coordinating Council (FRCC)
- Scott Beecher, sbeecher@frcc.com, (813) 289-5644

Midwest Reliability Organization (MRO)
- Salva Andiappan, sr.andiappan@midwestreliability.org, (651) 294-7081

Northeast Power Coordinating Council (NPCC)
- Phil Fedora, pfedora@npcc.org, (212) 840-4909
- Quoc Le, quoc@npcc.org, (212) 840-1070
- Jack Alvarez, jalvarez@npcc.org, (212) 840-1070

Reliability*First* Corporation (RFC)
- Rao Somayajula, rao.somayajula@rfirst.org, (330) 247-3061
- Leslie Krawczyk, leslie.krawczyk@rfirst.org, (330) 247-3060

SERC Reliability Corporation (SERC)
- Herb Schrayshuen, hschrayshuen@serc1.org, (704) 357-7372
- Maria Haney, mhaney@serc1.org, (423) 902-1904
- Teresa Glaze, tglaze@serc1.org, (205) 497-0981

Southwest Power Pool, Inc. (SPP)
- Michael Riley, mriley@spp.org, (501) 614-3276

Texas Regional Entity (TRE)
- Rashida Williams, rwilliams@ercot.com, (512) 225-7056

Western Electricity Coordinating Council (WECC)
- Donald Davies, donald@wecc.biz, (801) 582-0353
- Jason Wayment, jwayment@wecc.biz, (801) 582-0353

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