



North American Electric Reliability Corporation
Request for Proposal
Transmission Availability Data System (TADS) Phase I
Data Management System

Date Issued: November 2, 2007

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1 INTRODUCTION

NERC will require the mandatory collection of transmission availability data starting in 2008 on all Transmission Owners (TOs) registered in NERC's Compliance Registry.¹ The specification of the data required is described in a *Transmission Availability Data System Revised Final Report* dated September 26, 2007 (Report) as well as in the *TADS Data Reporting Instruction Manual* dated October 17, 2007 (Manual). A separate TADS workbook (2008 TADS Data Forms) dated November 2, 2007 is also provided. This workbook has 12 worksheets that are the data input forms which the Vendor will incorporate (in substance but not necessarily in format) into the TADS Data Management System. The reports and the workbook may be downloaded at <http://www.nerc.com/~filez/tadstf.html>. These documents are incorporated by reference into this RFP.

NERC is seeking a Vendor to develop software for a Web-based data management system that will have the characteristics listed below.

1. Controlled access to the database.
2. Capable of two modes of data entry.
3. Algorithms for checking data that has been input for errors based upon a set of defined rules.
4. Capable of generating reports and analysis based on a user defined query at the various levels (e.g., Transmission Owner, Regional Entity, and NERC level). These reports shall be formatted in Excel for export.
5. Utilize MS SQL 2000 or greater
6. Application layer written in ASP.net 2.0 or greater

¹ NERC has 306 Transmission Owners registered. Since TADS applies to TOs with assets that are greater than 200 kV, not all may be required to comply with TADS.

2 RESPONSE REQUIREMENTS

ALL RESPONSES ARE DUE AT NERC TO THE MAILING AND ELECTRONIC ADDRESSES BELOW NO LATER THAN December 3, 2007.

- ONE PRINTED COPY IS REQUIRED.
- A SEPARATE PDF ELECTRONIC RESPONSE IS ALSO REQUIRED.
 - Electronic responses will be shared with the Transmission Availability Data System Task Force. See Appendix 6 of the *Transmission Availability Data System Revised Final Report* dated September 26, 2007 for a list of members.

Mail address: North American Electric Reliability Corporation
ATTN: John Seelke
Princeton Forrestal Village
116-390 Village Boulevard
Princeton, NJ 08540

Send electronic copies to: tads-rfp@nerc.net
Please put "TADS Data Management System Proposal" in the subject line.

Telephone contact: 609-452-8060

Questions: Questions must be submitted in writing to the e-mail address above. Responses will be distributed to all entities who received the RFP. The name of the entity asking the question will not be disclosed.

3 FUNCTIONAL REQUIREMENTS

3.1 Background

NERC will require the mandatory collection of transmission availability data starting in 2008 on all Transmission Owners (TOs) registered in NERC's Compliance Registry.² The specification of the data required is described in a *Transmission Availability Data System Revised Final Report* dated September 26, 2007 (Report) as well as in the *Transmission Availability Data System Data Reporting Instruction Manual* dated October 17, 2007 (Manual). A separate TADS workbook (2008 TADS Data Forms) dated November 2, 2007 is also provided. This workbook has 12 worksheets that are the data input forms which the Vendor will incorporate (in substance but not necessarily in format) into the TADS Data Management System. The report, manual, and workbook may be downloaded at <http://www.nerc.com/~filez/tadstf.html>. These documents are incorporated by reference into this RFP.

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3. Algorithms for checking data that has been input for errors based upon a set of defined rules.
4. Capable of generating reports and analysis based on a user defined query at the various levels (e.g., Transmission Owner, Regional Entity, and NERC level). These reports shall be formatted in Excel for export.
5. Utilize MS SQL 2000 or greater
6. Application layer written in ASP.net 2.0 or greater

3.2 Transmission Owner Master Table

Transmission Owners will be subdivided two classes:

1. Non-reporting TOs who do not own TADS assets and who therefore are not required to report outage data. They are required to submit Form 1.1, and it will be entered into the TADS database by a Regional Entity.
2. Reporting TOs who are required to report Form 1.2 and all subsequent forms that are applicable.

These categories will be used to define who can request access to the data and when they can access it.

All non-reporting and reporting TOs are associated with a region (one of eight) and a country (one of three). This data will be maintained in a separate NERC-provided **TO Master Table** (not shown as a data input form) for each Transmission Owner, with these characteristics:

1. The TO's NERC ID
2. The TO's name
3. The name of the regions where the TOs facilities are located (allow two (2) different Regional Entity (RE) names per TO).

² NERC has 306 Transmission Owners registered. Since TADS applies to TOs with assets that are greater than 200 kV, not all may be required to comply with TADS.

4. The name of the country where the TOs facilities are located (allow two (2) different country names per TO).
5. The designated YEAR of these TO characteristics and associated data (i.e. 2008).

One TO Master Table will be provided by NERC for each reporting year that contains the information listed above. NERC shall be capable of updating this data.

The table design will be capable of accessing, by TO, the status of each of the 12 data input forms:

1. Whether the form is required or not required of the particular TO.
2. If required, whether any data has been entered.
3. If data has been entered, the level of error checking the data has passed (TADS software, RE, or NERC).

The software will be capable of updating the forms status as the TADS data cycle progresses.

The table will contain a field for each form that identifies the confidential status of each form. Table 3.1 provides the default confidentiality status for each form.

Table 3.1

Form	Default Confidentiality
1.1 Non-Reporting Transmission Owner Statement	Not confidential
1.2 Reporting Transmission Owner Information	Not confidential
2.1 Tie Lines and Jointly-Owned AC and DC Circuits	Confidential-CEII
2.2 Jointly-Owned 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

As presently constructed, data on each form is either not confidential or confidential as critical energy infrastructure information (CEII). A third confidential status input will be allowed: data is confidential as CEII, but metrics computed with the data may be displayed (“Confidential-CEII, metrics OK”). Only a NERC Administrator will have the ability to change the Confidentiality status.

Finally, the some TOs may want to have the ability to assign additional attributes to themselves. These additional entries might associate a TO with a regional transmission organization (e.g., MISO, PJM, etc.), a holding company (e.g. Southern Company, Xcel Energy, etc.), or some other similar group (e.g., IOU, municipal, etc.). These additional attributes should be named “Attribute #1,” “Attribute #2,” and “Attribute #3” for now. Since not all TOs will have additional attributes, they need not be in the TO Master Table, but they should be related to the TO Master Table.

Other TO information, such as TO contact information, should be related to the TO Master Table. (The information above is already contained on Form 1.1 or 1.2.)

NERC is receptive to alternatives to a TO Master Table that will accomplish the goals described above.

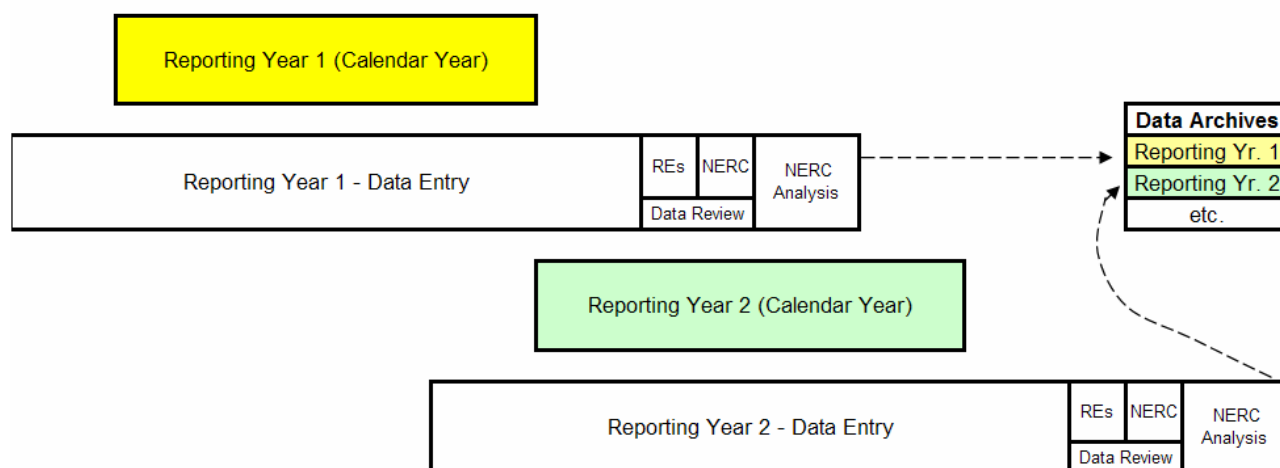
3.3 TADS Database Access

The Vendor will design database access and reports that meet the objectives described in this section. Figure 3.1 shows a data reporting and analysis cycle for two years. It shows overlapping periods of data entry for different reporting years. Five distinct periods are shown for a reporting year:

1. Data Entry
2. RE Data Review
3. NERC Data Review
4. NERC Analysis
5. Data Archiving

For purposes of describing access, the “NERC Data Review” period has been combined with the “NERC Analysis” period into one “NERC Data Review and Analysis” period.

**Figure 3.1
TADS Data Cycle**



3.3.1 Database Administrators

Database administrators are needed at three different levels. Table 3.1 lists the three different levels of administrators and an estimate of the number of administrators needed for each.

Table 3.2: Database Administrators

Administrator	Number
NERC	1
Regional Entities	8
Reporting Transmission Owners	Up to 300

The following hierarchy for assigning administrators is required: NERC’s administrator will have the ability to assign/change RE administrators and REs will have the ability to

assign/change TO administrators for TOs within their region. A TO with assets in two regions would have two administrators, although these could be the same individual.

1. Each administrator will have the ability to assign/change database access rights to non-administrator individuals, referred to as its “designees.” Those designees may have:
 - a. Read/query access, or
 - b. Read/query/edit access
2. The NERC administrator, or a NERC designee with edit capability, will define, by data entry, the beginning of each of the four periods for each reporting year.
3. Each administrator will have full read/query/edit access permissions. However, the permissions of administrators (and their designees) are not static during the data cycle. As described below, they must be capable of changing at different points in the TADS data cycle.
4. **Non-reporting TOs** will not have database access. Their Form 1.1 data will be entered by REs to avoid giving non-reporting TOs access for this one form.

Although “query” capability is mentioned above, actual reports are discussed in different sections:

1. Section 3.3.3 describes database access reports
2. Section 3.4.3 describes reports and queries needed for Data Entry and Data Review.
3. Sections 3.5 and 3.6 define reports and queries needed for analysis by NERC and others.

These sections describe the types of reports and queries that must be available to those with query permission at different parts of the TADS data cycle.

3.3.2 Database Permissions (prior to Data Archiving)

Database permissions are described in the tables 3.3 and 3.4 below. Since the permissions are the same for two periods (NERC Data Review and NERC Analysis) they have been combined in the tables.

1. Table 3.3 is for non-reporting TOs. As described in section 3.3.1 above, non-reporting TOs will not have access to the database prior to Data Archiving.
2. Table 3.4 is for reporting TOs. They have exclusive permission to read/query/edit their data during the Data Entry period. When that period ends, the permission to edit data of reporting TOs shifts to REs and finally to NERC.

Table 3.3: Non-reporting TO Data Permissions (Form 1.1 only)

Period	RE	NERC
Data Entry	Read/query/edit regional TO data	Read/query all TO data
RE Data Review	Read/query/edit regional TO data	Read/query all TO data
NERC Data Review and Analysis	Read/query regional TO data	Read/query/edit all TO data

Table 3.4: Reporting TO Data Permissions (all forms except Form 1.1)

Period	Reporting TO	RE	NERC
Data Entry	Read/query/edit TO data	Read/query regional TO data	Read/query all TO data
RE Data Review	Read/query TO data	Read/query/edit regional TO data	Read/query all TO data
NERC Data Review and Analysis	Read/query	Read/query all TO data	Read/query/edit all TO data

The structure described above for reporting TOs need to be flexible since in some regions, a TO may want to delegate its Data Entry permissions (described above as “read/query/edit”) to its RE. The ability to allow that delegation by an entry into the TO Master Table by NERC (or other means suggested by the Vendor), so that the delegation can be on a TO-by-TO basis within a region. If a TO delegates its Data Entry permissions, it will still have read/query capabilities, but no edit capability.

“Permissions” and the user’s identity must be coordinated for both accuracy and security reasons. For example, an RE user may only have access to the data of TOs within its region’s footprint. A reporting TO user must only have the ability to input and edit data associated with its NERC ID unless it has delegated that role to its RE. The Vendor’s database access protocols will need to ensure that proper credentials are established before an individual can read, query, or edit data.

3.3.3 Database Access Reports

The software shall be capable of providing a table of users that have access, grouped by administrator, identifying each user and their permissions. Table 3.5 shows the pool of users by level of administrator:

Table 3.5

Administrator	Users
NERC	NERC authorized
RE	RE authorized
Reporting TO	Reporting TO authorized

The NERC administrator will have the ability to request a table of *all* users, an RE administrator will be able to request a table for their region users (RE and reporting TO users), and a reporting TO administrator will be able to request a table of users they have authorized. The table should also identify which TOs have delegated their Data Entry capability to their RE. The table should also identify which TOs have delegated their Data Entry capability to their RE.

3.4 TADS Data Entry

The Vendor will design data entry software that meets the objectives in this section.

3.4.1 TO Data Entry

Two different methods of TO data entry are required:

1. The first method will allow a Transmission Owner to input data in a Web-based system that mimics the spreadsheets in the Manual. If the TO elects this method, it will have the

ability to input data as outages occur, with the ability to update and correct previous data entries.

2. A second method will allow the Transmission Owner to bulk load data using an XML interface to the database.

Incompatible data combinations will be flagged based upon rules that NERC has specified in Appendix A. If a user is inputting individual outage data via the Web, the data that is incompatible with a previous entry must be flagged with a message. The system will be designed to “accept” incompatible data entered by a TO for later correction. The system must be capable of produce an error and warning report that provides a summary of errors and warnings identified in the TO’s database.

Data must generally pass all error checks before it is accepted as valid for further review by REs and NERC. However, in the event that an error check wrongly flags correct data as incorrect (due to special circumstances for a TO or due to a misspecification by NERC of what constitutes an error), allow an RE or NERC to enter an explanation that “comments” on errors that were accepted (despite being flagged) on a TO-specific basis and makes these comments part of the TOs data. REs or NERC should be able to access a TOs error comment record even when they do not have edit capability for other TO data. When describing the “error status of data on each form in the TO Master Table, data that required no comments will be “error free” while data that required comments on errors that were flagged will be “error free with comments.” Data with any uncommented errors will flagged as “contains errors.”

3.4.2 Data Relationships

Appendix B diagrams the *approximate* relationships between the forms for a reporting TO³. This map is provided so that the Vendor may better understand how data on the forms is interrelated. As described in Appendix A, Section B, we want certain TO data required on certain forms to be linked to the TO Master Table. This is discussed in the table in Section B under Forms 1.1, 1.2, 2.1, and 2.2. Also, data of Forms 1.1 and 1.2 may be used to populate the TO Master Table.

Appendix B is not a functional design specification and is only included for reference. There are many different ways to structure the data relationships so that they are both logical and efficient, and the Vendor is expected to propose a design that accomplishes these purposes.

3.4.3 RE and NERC Data Review

REs will review data received from its TOs. NERC will review data that has been reviewed by REs.

1. REs will do high-level checking of Transmission Owner completed data. If data errors are suspected⁴, they will coordinate with the TOs to either verify that the data is correct and if incorrect, they will correct it.
2. REs will also examine the Event ID Code data submitted by TOs and assign a common Event ID Code to Events that cross TO boundaries (if any).
 - a. NERC will follow-up after REs have evaluated Event ID Code data and assign a common Event ID Code to Events that crossed RE boundaries.

³ Form 1.1 for non-reporting TOs has no relationship to the other forms.

⁴ These would be data errors not captured by the software’s error checking routines.

3. RE's will also examine AC Circuit outages that occur on a common structure to determine the proper Event Type Number and Event ID Code assignment if circuits on the common structure are owned by different TOs.

3.4.4 Reports Format

All reports described in this RFP shall be available for display and export. Exports will be formatted in "comma separated variable".

3.4.5 Data Entry/Data Review Reports and Queries

The following reports and queries are needed for the Data Entry and Data Review. The Vendor will ensure that individuals requesting a report or query have the appropriate credentials. Although certain reports are identified as optional, it is requested that the Vendor quote the cost of incorporating these optional reports separately.

1. Forms report. A TO (or an RE acting on behalf of a TO) may request a report that contains the information on a specific form or forms (e.g., Form 4.1) or *all* forms. This request may be made at any time in the data cycle, including data in the Data Archives.
2. Error and warning report. For each user that edits a TO's data, a TO error and warning report shall be offered to the user prior to him/her logging out. The error and warning report must identify the data that is in error and also provide an error message describing why the data is in error or may be in error (for warnings). It shall also include all "error comments" as described in Section 3.4.1. In addition, a TO error and warning report may be requested at any time by a TO for its data. An RE may only request this report for an input list of TOs in its region or for all TOs in its region, while NERC shall be able to have the same request capability allowed for a single region, but for all regions.
3. Momentary/Sustained Outage Sorting. An entity with query capability and proper permissions may request a sorting of outages entered on Forms 4.1, 4.2, 4.3, or 4.4 for a specific TO into two lists: one list will have the information reported on columns A-P for all Momentary Outages, and a second list will have this same information for all Sustained Outages. TOs may only request this sort for their own data. A region may request the sort for any TOs in its region, and NERC may request it for any TO.
4. Events Outage Start Time sort. For the purpose of flagging potential common Events within a region (or NERC-wide), an RE or NERC may request a list of outages (by region for REs and NERC-wide for NERC) with Outage Start Times within a user-input time window. For example, if the user-input time window is 5 minutes, all outages with an Outage Start Time within 5 minutes of each other will need to be listed, along with this data for each outage:
 - a. The TO's name and NERC ID, its region, its country.
 - b. All data listed on columns A through P on Forms 4.1, 4.2, 4.3, or 4.4.
 - c. Data on Form 5 (columns B-D) associated with the Event ID Code for the outage.
5. AC Multi-Owner Common Structure Flag sort. An RE or NERC may request a list of all AC Outages with AC Multi-Owner Common Structure Flag equal to 1. The list will include the same outage data described in item 4.a-c above. See Appendix 6 of the Manual for an explanation of this flag.

Optional reports

6. Log-on report. The system will have the capability of producing a report of the individuals who, with edit capability of a non-reporting or reporting TO's data, logged

onto TADS between an input range of dates and times. The log will show the log on and log off date/time for each individual. This report may be requested by an individual with edit capability in the appropriate time period as described in Tables 3.3.2 A or B. For example, during the Data Entry period, an edit log report may be requested by a reporting TO for its data.

7. Post Data Entry period change report. The system will be able keep a copy of each non-reporting and reporting TO's data at the end of the reporting year's Data Entry period. The system will also be capable of producing a report of all data changes after the Data Entry period is closed on a TO-specific basis. For example, for each Form a data entry 'Date Stamp' field may be included in the software to identify when each record was last changed. For audit trail purposes, this feature may be used from the end of the Data Reporting Period until one year after Data Archiving. It will allow TOs and others to determine if subsequent data entries are correct or require modification. These reports may be requested by:
 - i. A reporting TO for its data only.
 - ii. An RE for data of all non-reporting and reporting TOs within its region only.
 - iii. NERC for data of all non-reporting and reporting TOs.

3.4.6 Special First Quarter 2008 Data Submittal

As described in the Manual, TOs will be submitting data for the first quarter of 2008 for subsequent data review by REs and NERC and then analysis by NERC. The first quarter will be a year defined as "2008Q1." Minor form changes are required:

- a. On Forms 2.1 and 2.2, the first question has a phrase "reporting year" that will be changed to "2008Q1."
- b. On Forms 3.1, 3.2, and 3.3, columns headings with the word "year" or "annual" will be changed to "Q1"
- c. On Form 3.3, notes 3, 5, and 7 will have the word "year" changed to "Q1."

Data for 2008Q1 will need to be resubmitted for the 2008 annual submittal. In addition, since 2008Q1 data is not due until May 30, 2008. To avoid duplicate entries of 2008Q1 data and to provide a clean break between 2008Q1 and 2008, NERC will not open the 2008 Data Entry period until after May 30, 2008 (perhaps as late as August 2008). However, to avoid re-entry of a TO's entire 2008Q1 data into 2008, we want a TO's 2008 data be populated with certain 2008Q1 data that has undergone RE and NERC review, while other data would be not be accepted or would be modified by the software as described below. This process is intended to accept data that does not require changes, reject data that requires re-entry, and change certain data so that an "error" will be produced which requires that data to be specifically addressed by the TO. We are open to Vendor recommendations on other approaches to convert 2008Q1 data to 2008 data.

Table 3.6

Form No.	Recommended Changes to 2008 Q1 data set for 2008 data set
1.1	Accept all 2008Q1 data.
1.2	Accept the 2008 Q1 contact information, but make the submission status of all forms "Not submitted" with the exception of Forms 2.1 and 2.2.
2.1, 2.2	Accept all 2008Q1 data, but change the answer to the first question to "NA- 1 st submittal."

3.1, 3.2, 3.3, and 3.4	All of this data needs to be rejected and re-entered because it is specific to the reporting period.
4.1-4.4	Remove any Outage Durations coded as “9999” so that the Outage Duration field has no entry (an error).
5	Accept all 2008Q1 data.

3.5 NERC Analysis

Data for the current reporting year that has passed through the data checks described above will be used to develop NERC annual reports as well as data that are archived. The NERC annual reports will be developed from standard reports based upon the formulas in Table 3.7 calculated as well as from a set of standard queries. Reports and queries are required on several levels:

1. For individual reporting TOs
2. For each NERC region
3. For each NERC region, but including only TOs that are in a specified country (e.g., the U.S.)
4. For NERC as a whole
5. For a country as a whole.

3.5.1 Confidentiality

For any regional, NERC-wide, or country report that would display information of a single Transmission Owners, the software must determine whether reporting their information is appropriate. The data or metrics would have been calculated using information on one of five forms (3.4, 4.1, 4.2, 4.3, or 4.4); therefore, if the confidentiality status of the relevant forms for the affected TO is “Confidential-CEII, metrics OK,” their information may be displayed. For other TOs, do not display their information. Instead, create a report that displays the Transmission Owners NERC ID, name, region, and the asset class for which data cannot be displayed. The asset class will be one of the classifications shown on Form 3.4. Also allow NERC, by input, to have the software combine the outage information of confidential TOs with another asset class in the region specified by NERC.

3.5.2 Standard Reports

1. The reports described in this section shall be capable of being separately requested for each of the levels listed in Section 3.5.
2. Table 3.7 shows a standard set of metrics that can be calculated for any of the levels defined above.
 - a. The metrics in Table 3.7 are to be calculated by Element type, with Overhead or Underground calculated separately (for circuits only), and Voltage Class using the classifications shown on Form 3.4. If an Element has zero Sustained Outages, display metrics #5, #6, and #7 as “NA: zero Sustained Outages.” Metrics #11, #12, and #13 only apply to AC Circuits. Metrics #14, #15, and #16 only apply to Overhead AC Circuits and DC Circuits on common structures.
 - b. For Metric #11, #12, and #13, calculate alternative metrics (and label them #11A, #12A, and #13A) that include *only* outages that are Element-Initiated.
 - c. For each metric calculation, the Vendor shall display the result as well as the formula variables that were used to calculate the result. For example, for metric # 1 (TOF), if the Total Automatic Outages is 2 and the Number of Elements is 80,

display the result (2/80), or 0.025, as well as the formula variables (2 and 80 in this case).

- d. For calculations of MTTR, a confidence interval shall be calculated as described in Appendix B.
3. There are two items that the Vendor needs to incorporate into the software that are not obvious from Table 3.7:
 - a. For all levels of reports, for the calculation of multiple circuit outage frequency per 100 Multi-Circuit Structure Miles (items #14, #15, and #16 on Table 3.7), the TADS database contains Multi-Circuit Structure Miles for AC Circuits (Form 3.1) but not for DC Circuits. DC structures are assumed to have two circuits per structure. Therefore, the number of DC Multi-Circuit Structure Miles (by Voltage Class) shall be calculated by multiplying the DC Circuit Miles shown on Form 3.1 by one-half.
 - b. For regional and NERC-wide analysis only, the following special case applies:

When counting the number of Event Type No. 30 outages from data on Form 5, if an Event Type 30 outage is associated with an Event ID Code for an AC Circuit outage that also has the AC Multi-Owner Common Structure Flag set to one (1), there should be another TO in the same region with the same Event ID Code that has the AC Multi-Owner Common Structure Flag also set to one (1) and with an outage that has the same Start Time. (These incidences require investigation by each RE who are to assign a common Event ID Code if an Event Type No. 30 occurs on common structures with circuits owned by different TOs.) For these cases, count only *one* Event Type No. 30 outage (not both) towards the total regional Event Type No. 30 outages since each TO (with one circuit) is reporting one half of a multi-circuit outage.

For the individual reporting TOs impacted by the scenario described above, leave their data “as is,” recognizing that each TO’s metrics from Event Type No. 30 outages associated with TOs that own separate circuits on common structures will be misstated.

4. For all level of reports and for all Element classifications shown on Form 3.4:
 - a. Display the total number of Momentary Outages and calculate the % of Momentary Outages by:
 - i. Fault Type
 - ii. Outage Initiation Code
 - iii. Initiating Outage Cause Code.
 - iv. Outage Mode Code.
 - v. Month within the year
 - b. Display the total number of Sustained Outages and calculate the % of Sustained Outages by:
 - i. Fault Type
 - ii. Outage Initiation Code
 - iii. Initiating Outage Cause Code.
 - iv. Sustained Outage Cause Code.
 - v. Outage Mode Code.
 - vi. Month within the year

- vii. Each of five (5) duration intervals: 1-5 minutes; 5-10 minutes, 10-30 minutes, 30 minutes-2 hours, greater than two hours.
 - c. Display the total Sustained Outage Hours and calculate the % of total Sustained Outage hours by:
 - i. Fault Type
 - ii. Outage Initiation Code
 - iii. Initiating Outage Cause Code.
 - iv. Sustained Outage Cause Code.
 - v. Outage Mode Code.
 - vi. By month within the year.
- 5. For the special first quarter analysis, no adjustment to the metrics calculations described in this section are required if programmed properly, but some label changes are required. As an example, the total Element hours in MTBF should be based on the equivalent number of Elements in the quarter times the number of hours in the quarter instead of the year. No label change is required for MTBF. All frequency calculations (metrics #1, #2, #3, #4, #11, #11A, #12, #12A, #13, #13A, #14, #15, and #16) will be outages per quarter instead of per year, so these require a label change only.

3.5.3 Standard Queries

- 1. The queries described in this section shall be capable of being separately requested for each of the levels listed in Section 3.5.
- 2. The queries are to be driven by several options as defined below:
 - a. Element: Allow the choices shown on Form 3.4:
 - i. Elements (one of four)
 - ii. OH or UG (if applicable)
 - iii. Voltage Ranges (one of four for AC Elements, one of five for DC Elements)
 - b. Outage characteristics: Allow choices from the characteristics shown below. (An “all” choice shall be included for each characteristic except iv.)
 - i. Outage Type (Momentary and/or Sustained)
 - ii. Fault Type
 - iii. Outage Initiation Code
 - iv. Outage Start Time range - - allow two input time intervals (date and UTC time). A full reporting (calendar) year will have UTC ranges from January 1 00:00 and December 31, 23:59 of the year.
 - v. Outage Duration range for Sustained Outages only- allow two input time intervals (hours and minutes) such as [0 hr., 1 min.] to [1 hr., 30 min.], but include a choice of “all.”
 - vi. Initiating Cause Code
 - vii. Sustained Cause Code
 - viii. Outage Mode Code
 - c. Metrics: Allow choices from Table 3.7, with the additions described in Section 3.5.2, paragraphs 2.b and 2.c, plus these metrics: 1) number of Momentary Outages, 2) number of Sustained Outages, and 3) number of Sustained Outage Hours. Paragraphs 2.d in Section 3.5.2 will apply to MTTR calculations. The user may select one or several metrics that will be computed for the selected Element and outage characteristics.

- i. Certain metrics may not be available based upon the previous selections. For example, if Momentary Outages are selected, metrics that involve Sustained Outages will be unavailable. If Transformers are selected, circuit mile metrics do not apply.
- ii. Other metrics will not be available unless complete multiple reporting years are specified. These include all frequency metrics plus metrics # 8 and #9.
- iii. When computing metrics that covers multiple reporting years, use all the data for the period in the computation. As an example, suppose that a TO has 40 total outages in 2008 and 20 outages in 2009, and the equivalent number of Elements taken from Forms 3.1 is 100 in 2008 and 120 in 2009. The total outage frequency per year for the two year period will be $(40+20)/(100+120) = 60/220$. Do not compute an average of $40/100$ and $20/120$. These are not the same.

As an example of what a query could produce, suppose NERC elects to run a regional report for the 200-299 kV AC Overhead Circuits Momentary Outages for a reporting year (defined by the Outage Start Time range), with each other outage characteristic selected as “all,” and metric #3 (MOF). The resulting MOF will be identical to the MOF metric for the region in the standard report of the same reporting year described above.

3.6 Data Archives: Analysis by Others

Other entities with query rights may access the data in the Data Archives and request the standard reports described in Section 3.5.2 or perform standard queries as described in Section 3.5.3. Proper credentials are required.

1. A TO may request reports or query its own data, its region’s data, or NERC-wide data.
 - a. The additional TO attributes described in Section 3.2 shall be designed into the software so that a TO may query an affiliated “group” in the future.
2. An RE may request reports or query any TO within its region, its own regional data, or NERC-wide data
3. NERC will have the ability to query data of any TO, any RE, or NERC-wide data

Table 3.7
TADS Standard Metrics (p. 1 of 2)

No.	Metric	Formula	Units	Acronym
<i>Element Outage Frequency</i>				
1	Element Total Automatic Outage Frequency	Total Automatic Outages / Total Elements	No. Automatic Outages per Element per year	TOF
2	Element Sustained Outage Frequency	Total Sustained Outages / Total Elements	No. Sustained Outages per Element per year	SOF
3	Element Momentary Outage Frequency	Total Momentary Outages / Total Elements	No. Momentary Outages per Element per year	MOF
<i>Element Outage Duration, Repair Time, and Up Time</i>				
4	Element Sustained Outage Duration Time	Total Sustained Outage Hours / Total Elements	Average no. of Sustained Outages Hours per Element per year	SODT
5	Element Sustained Outage Mean Time to Repair	Total Sustained Outage Hours / Total Sustained Element Outages	Average no. of Sustained Outage Hours per outaged Element	MTTR
6	Median Time to Repair Sustained Element Outage Failures	The time when 50% of the Mean Time to Repair minutes are greater than this figure	Median no. of Sustained Outage Hours per outaged Element	MdTTR
7	Mean Time Between Sustained Element Outages (Mean "Up Time"). Also referred to as Mean Time Between Failures.	(Total Element Hours - Total Sustained Outage Hours) / Total Sustained Element Outages	Mean (average) no. of hours of operation of an Element before it fails	MTBF ¹
<i>Element Availability</i>				
8	Element Availability Percentage	1- (Total Sustained Outage Hours / Total Element Hours) * 100	Percentage	APC ¹
9	Percentage of Elements with Zero Automatic Outages	Total Elements with Zero Automatic Outages / Total Elements	Percentage	PCZO
10	Percent of Element Automatic Outages associated with a Disturbance Report (EOP-004)	Total Automatic Outages associated with a Disturbance Report / Total Automatic Outages	Percentage	PCDR

Table 3.7
TADS Standard Metrics (p. 2 of 2)

	Metric	Formula	Units	Acronym
	<i>Circuit Outage Frequency, per 100 Circuit Miles (Applies to AC and DC Circuits Only)</i>			
11	Circuit Total Outage Frequency, Mileage Adjusted	$(\text{Total Circuit Automatic Outages} * 100) / \text{Total Circuit Miles}$	No. Automatic Outages per 100 Circuit Miles per year	TCOF _{100CTmi}
12	Circuit Sustained Outage Frequency, Mileage Adjusted	$(\text{Total Circuit Sustained Outages} * 100) / \text{Total Circuit Miles}$	No. Sustained Outages per 100 Circuit Miles per year	SCOF _{100CTmi}
13	Circuit Momentary Outage Frequency, Mileage Adjusted	$(\text{Total Circuit Momentary Outages} * 100) / \text{Total Circuit Miles}$	No. Momentary Outages per 100 Circuit Miles per year	MCOF _{100CTmi}
	<i>Multiple Circuit Outage Frequency per 100 Multi-Circuit Structure Miles (For AC Circuits, multi circuit outages are Event Type 30 outages; for DC Circuits, they are Event Type 40 outages.)</i>			
14	Multi Circuit Total Outage Frequency, Mileage Adjusted	$(\text{Total Multi-Circuit Automatic Outages} * 100) / \text{Total Multi-Circuit Structure Miles}$	No. Automatic Outages per 100 Multi-Circuit Structures Miles per year	TMCOF _{100STmi}
15	Multi-Circuit Sustained Outage Frequency, Mileage Adjusted	$(\text{Total Multi-Circuit Sustained Outages} * 100) / \text{Total Multi-Circuit Structure Miles}$	No. Sustained Outages per 100 Multi-Circuit Structure Miles per year	SMCOF _{100STmi}
16	Multi-Circuit Momentary Outage Frequency, Mileage Adjusted	$(\text{Total Multi-Circuit Momentary Outages} * 100) / \text{Total Multi-Circuit Structure Miles}$	No. Momentary Outages per 100 Multi-Circuit Structure Miles per year	MMCOF _{100STmi}

4 PROPOSAL AND EVALUATION REQUIREMENTS

4.1 Services Requested

NERC requests a Vendor to perform the following services:

1. The Vendor will develop software that meets the functional requirements in Section 3. NERC will own the software and all intellectual property rights to the software developed by the Vendor under this RFP. The software developed shall be capable of being modified in the future by the successful Vendor, or other vendor chosen by NERC. Vendor will provide software design documentation, database schema, source code, and, if applicable, maintenance documentation.
2. The Vendor will install the software on NERC-designated facilities and successfully perform acceptance tests. NERC or its contractor will operate the system.
 - a. The Vendor will populate the software with NERC-provided data described in Section 3.2. NERC data will be provided in either an Excel or CSV format (Vendor to specify which format).
3. The Vendor will specify minimum facilities for installing the software. The system shall be capable of accommodating data for 300 Transmission Owners covering a 10 year period. The total number of records for all TOs per year entered on Forms 4.1 through 4.4 is estimated at 30,000. This same number of records (30,000) approximates the number of rows expected on Form 5 for all TOs per year. The system shall be capable of accommodating 200 simultaneous users with the longest response time for a query or report generation of one minute.
4. The Vendor will train NERC staff and supply a user manual.
5. The Vendor will provide software support (bug fix and maintenance) for an eighteen (18) month warranty period after acceptance.
6. The Vendor will provide its 2008 hourly rates for software modifications that that NERC may request for work to be initiated in 2008.
7. Vendor will manage the project as specified in Section 5.

4.2 Optional Services

Vendors may propose additional optional services in addition to those in Section 4.1. In addition, the Vendor may propose an alternative business format that meets the requirements in Section 4.1.

4.3 Written Proposal

The written proposals shall include the following discussions, organized by sections, as outlined below for the required service.

1. Schedule and Charges
 - a. Project schedule. We expect the project will take approximately 8-10 weeks from award of contract to acceptance.
 - b. Project charges broken down into:
 - i. Software development. Breakout the charges for all optional reports.

- ii. Installation and acceptance tests
 - iii. Training
 - iv. Software support for a one-year warranty period
 - v. Licensing fees for all software including: initial cost and annual recurring costs
 - c. Charges for optional services, if applicable
- 2. Technical Discussion
 - a. Proposed approach
 - b. Explanation of reasons for the proposed approach related to the three major functional requirements: database access, data entry and review, and data analysis.
 - c. Recommended facilities for the software.
 - d. Testing plans and criteria for acceptance tests for approval by NERC
 - e. Training plans for NERC staff
 - f. Optional services, if applicable
- 3. Vendor Attributes
 - a. Qualifications and capabilities of Vendor
 - b. History of similar Vendor developed and supported systems within past three years
 - c. A list of three customer references and contact information, for similar Vendor-developed and supported systems
 - d. Key personnel resumes
- 4. Additional Information
 - a. A discussion of assumptions made for this proposal
 - b. A list of risks associated with this proposal
 - c. A list of any exceptions to this RFP
 - d. A discussion of the Vendors project management approach
 - e. Subcontracts, if applicable
 - f. A list of necessary software licenses. If any licenses are to be obtained by NERC, this shall be clearly identified. For each license that is to be obtained by NERC, a cost estimate (one time and recurring) for each is required.

4.4 Evaluation Criteria

The following criteria will be used by NERC in evaluating proposals submitted in response to this RFP. Vendors should not minimize the importance of an adequate response in any area, as all of the criteria listed will be considered in determining NERC's selection.

1. Vendor's understanding and ability to perform requirements
2. Vendor's recommended approach and technical soundness
3. Vendor's project management plan
4. Vendor's resources
5. Vendor's experience and past performance
6. Vendor's willingness to accept NERC contract terms and conditions
7. Cost
8. Schedule

5 PROJECT MANAGEMENT

NERC will designate a Software Project Manager, who will be responsible for overall direction of the software development and testing work. NERC will also designate a TADS Data Manager for software implementation and shakedown during the warranty period. The Vendor will designate an overall single Project Manager who will be responsible for directing the initial software development, acceptance tests, and implementation prior to and during the warranty period.

5.1 Project Reports

The Vendor will submit biweekly written status reports to the NERC Software Project Manager covering the following items:

1. Percent of software work completed and % expected to be complete per work plan/schedule in the Vendor's RFP, or a mutually agreed upon revised schedule.
2. Reason for any discrepancies between actual and schedule.
3. Tasks scheduled for following two weeks
4. Any anticipated problems with meeting schedule.
5. Fund expenditures, including incurred costs which have not been invoiced, compared to budget projections.

5.2 Testing

Vendor will provide a testing plan for NERC's approval at least three weeks prior to the start of any part of the acceptance testing. NERC shall have the right to incorporate additional tests, change the sequence of test, or modify the steps within any test sequence as it sees fit. Acceptance of the TADS Data Management System will not take place until successful completion of the steps described in the testing plan. Should any the system fail any part of the initial acceptance test, NERC reserves the right at its sole discretion to retest only the system that failed, any parts of the test plan that it deems necessary to ensure that changes have not impacted other parts of the system, or the entire test plan.

6 SYSTEM ACCEPTANCE

Final system acceptance shall be made in writing by NERC after successful completion of all contractual obligations and technical specifications. Under no circumstances shall the warranty period begin or final payment be made prior to NERC's final acceptance of both the TADS Phase I Data Management System.

7 KEY PERSONNEL

The Vendor shall identify those individuals who are to be considered key personnel for performance of the work under this RFP. Any change in key personnel associated with the project shall not be made without the prior written approval of the NERC Software Project Manager.

8 SUBCONTRACTING

The Vendor may elect to arrange subcontracting with others. If such arrangements are proposed they should be clearly identified in the Vendor's proposal. All subcontracting arrangements must have prior written approval of NERC.

9 GENERAL TERMS AND CONDITIONS

9.1 Reservation of Rights

NERC reserves the right to revise or revoke the RFP, totally redefine the project, or elect not to undertake this project at all. NERC also reserves the right to reject all Vendor proposed bids and reissue this or a modified version of this RFP.

NERC does not authorize the start of work or incurrence of costs to be paid by NERC prior to the execution of a formal contract unless there is a separate written agreement to such effect.

9.2 Conflict of Interest

NERC will not consider a proposal if a known objectionable conflict of interest or question of ethics arises. If a Bidder fails to disclose an interest, NERC reserves the right to terminate or cancel a contract, which may have been entered into with such Bidder.

All Bidders shall make full disclosure in writing at the time of the proposal of any of the following existing business relationships with NERC personnel:

- If the Bidder is a private company, detail or ownership of shares by any NERC personnel. If the Bidder is a public company, ownership of shares in excess of 5% of total shares by any NERC personnel.

By submission of a proposal, the bidder certifies (and in the case of a joint proposal, each party certifies) that:

- No relationship exists or will exist during the contract period between the Bidder and NERC that interferes with fair competition or is a conflict of interest.
- The proposal has been developed independently without consultation, communication or agreement with any employee or Vendor of NERC who has worked on the development of this RFP, or with any person serving as an evaluator of the proposals submitted in response to this RFP.

9.3 Agreement

Prior to entering into a formal agreement, NERC and the Vendor shall resolve and document any differences between the Vendor's proposal and the specification stated in this RFP. The agreement between the Vendor and NERC shall consist of this specification, as resolved, and the Vendor's proposal as resolved. Any formal contract document shall reference this RFP and the Vendor's proposal. No oral understanding or statement shall modify the agreement. Changes to the above document can only be made in accordance with the procedures defined in this RFP.

9.4 Changes

No changes shall be made in these requirements unless authorized by an amendment to the agreement.

A change in the contract delivery schedule must be specifically approved in writing by NERC. The Vendor shall also provide an assessment of the impact of each specific change or addition on the project documentation.

9.5 Buyout of Agreement

During the course of the agreement, NERC may elect to negotiate a buyout of the agreement. NERC agrees to reimburse the Vendor for reasonable costs attributable to the buyout of the agreement after such costs are submitted to NERC in writing and approved by NERC in writing.

9.6 State Law

The laws of the State of New Jersey shall govern the validity, construction, effect, rights, remedies, enforcement, and obligations of this agreement.

9.7 Severability

In case any one or more of the provisions contained in the agreement should be determined to be invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remainder of the agreement shall be unaffected. The affected provision shall be amended or interpreted, if possible, so as to correct the deficiency and give effect to the intent of the parties.

9.8 Authorized Representatives and Notices

The Vendor shall designate a competent representative to represent and act for it. This representative shall have authority to make binding and enforceable decisions in the name of the Vendor and to accept all notices, which NERC desires to serve, or which are required by the agreement to be served, on the Vendor. The Vendor shall, upon commencement of performance of the agreement, advise NERC in writing of the name, address and telephone number (day and night) e-mail address, and pager number if applicable of such designated representative and of any subsequent change in such designation.

NERC shall be entitled to assume that the primary contact person indicated in the Vendor proposal is and remains the representative of the Vendor or Vendors until notified of any change by the Vendor.

NERC shall likewise designate its representative and shall notify the Vendor in writing of the name of such representative and of any subsequent change in such designation.

Any notices provided for hereunder may be served personally on the representative of either party or by registered mail to address of each party.

9.9 Assignment

The Vendor shall not assign or otherwise transfer the agreement or its right, title or interest herein, or any part thereof, to any individual, partnership or corporation without the prior written consent of NERC.

9.10 Project Delay – Liquidated Damages

If the Vendor fails to complete the project described in this specification within date specified in Section 6.1 Project Schedule, or on another date agreed to because of the changes, the Vendor or its sureties shall pay to NERC as fixed, agreed and liquidated damages for each calendar day of delay in completing the project, an amount equivalent of 0.15 percent of the sum of the contract price. These payments shall continue until a maximum value of 15% of the contract price has been reached. The Vendor shall make payments to NERC monthly.

9.11 Force Majeure

The non-performance or delay by the Vendor or NERC of any obligation under the agreement shall be excused of such non-performance or delay if caused by circumstances beyond their control "Force Majeure", except to the extent that the Vendor knows or should have been able to foresee the likelihood of such an event prior to NERC's award of the contract and failed to inform NERC thereof. Force Majeure shall include but not be limited to acts of God or of the public enemy, strikes, earthquakes, fires, floods, tempests or other natural disasters, epidemics, quarantine restrictions, war, riot, sabotage, acts of civil or military authority and priorities established by civil or military authorities having jurisdictions.

In the event of any delay attributable to any of the foregoing causes, the Project Schedule dates for performance of the work shall be extended for a period equal to the time lost by reason of the delay, provided the Vendor or NERC has taken reasonable steps to proceed with the performance of the work and has made notification of such delay and corrective action taken. The Vendor shall not be entitled to any increase in compensation.

Delays in performance by the Vendor that are caused by subcontractors or by suppliers or major equipment items for reasons other than those defined above, delays in documentation approval due to inadequate documentation or unrealistic approval schedules, and delays caused by the Vendor's lack of technical skills shall not constitute an excusable delay in performance by the Vendor and shall not be a reason for extending the date for performance of the work.

9.12 Suspension

NERC may at any time and at its sole option suspend the performance of all or any portion of the work to be performed under this agreement by providing notice in writing to the Vendor.

Upon receipt of any such notice, the Vendor shall, unless the notice directs otherwise, respond according to the following:

- The Vendor shall immediately discontinue work on the date and to the extent specified in the notice.
- The Vendor shall place no further orders or subcontracts for material, services or facilities with respect to the suspended portion of the work other than to the extent required in the notice.
- The Vendor shall promptly make every reasonable effort to obtain suspension, upon terms satisfactory to NERC, of all orders, subcontracts and rental agreements to the extent they relate to performance of the portion of work suspended.
- The Vendor shall continue to protect and maintain the portion of the work theretofore completed, including the portion of the work suspended hereunder, unless otherwise specifically stated in the notice.

As full compensation for such suspensions, the Vendor will be reimbursed for the following costs, reasonably incurred, without duplication of any item, to the extent that such costs directly result from such suspension of work:

- A stand-by charge will be paid to the Vendor during the period of suspension of the work which stand-by charge shall be sufficient to compensate the Vendor for keeping (to the extent required in the notice) its organization and equipment committed to the work in a stand-by status.

- All reasonable costs associated with demobilization of the Vendor's facility, forces and equipment will be paid to the Vendor.
- An equitable amount will be paid to the Vendor to reimburse the Vendor for the costs of maintaining and protecting that portion of the work upon which activities have been suspended.

Upon receipt of notice to resume the suspended portion of the work, the Vendor shall immediately resume performance on the suspended portion of the work to the extent required in the notice. Within 21 calendar days after receipt of notice to resume the suspended portion of the work, the Vendor shall submit for review a revised schedule. If, as a result of any suspension, the cost to the Vendor subsequently performing the work is increased or decreased, an equitable adjustment will be made in the cost of performing the remaining portion of the work. Any claim on the part of the Vendor for extension of time shall be made in accordance with the appropriate provisions of the agreement. No compensation or extension of time shall be granted if suspension results from Vendor's non-compliance with the terms of the agreement.

9.13 Optional Termination

NERC may, at its option, terminate the agreement in whole or in part at any time by giving seven (7) calendar days written notice thereof to the Vendor, whether or not the Vendor is in default. Upon receipt of any such notice, the Vendor shall, unless the notice directs otherwise, immediately discontinue performance of the work on the date and to the extent specified in the notice; shall place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the work as is not discontinued; shall promptly make every reasonable effort to procure cancellation upon terms satisfactory to NERC of all orders, subcontracts and rental agreements to the extent they relate to the performance of the portion of the work discontinued; and shall thereafter perform only such tasks as may be necessary to preserve and protect the portion of the work already in progress and to protect materials and equipment at NERC sites or in transit thereto.

Upon any such optional termination, the Vendor agrees to waive any claims for damages, including loss of anticipated profits and idle equipment, personnel or facilities on account thereof, and agrees that the sole remedy of the Vendor is to receive payment calculated on the basis of the payment schedule of the agreement for all the work properly completed by the Vendor, together with the reasonable costs occasioned by such termination and not previously paid, less such sums as the Vendor has already received on account for the portion of the work performed. If, at the date of such termination, the Vendor has properly prepared or fabricated any products for subsequent incorporation at NERC, and if the Vendor delivers such products to such place as NERC shall reasonable direct, then the Vendor shall be paid for such products or materials. Upon any such termination, the obligations of the agreement shall continue as to the portion of the work already performed and as to the bonafide obligations assumed by the Vendor prior to the date and termination. The provisions of the agreement that, by nature, survive final acceptance of the work hereunder shall remain in full force and effect after such termination to the extent provided in the agreement.

9.14 Termination for Default

The Vendor will be considered in default of the contract should the Vendor at any time: refuse or neglect to supply sufficient and properly skilled workmen, materials of the proper quality or quantity or equipment necessary to perform the work hereunder properly; fail in any respect to

prosecute the work hereunder or any portion thereof with promptness, diligence or in accordance with any of the provisions set forth herein; go into liquidation (other than as part of a corporate reorganization); enter into composition or compromise with its creditors; or become insolvent. NERC will so notify the Vendor of the default in writing. Upon receipt of any such written notice of the default, the Vendor shall, at its own expense, preserve all materials, equipment and plant and undertake immediate steps to remedy such default.

Should the Vendor fail to remedy such default within seven (7) calendar days after receipt of such written notice of default, NERC may, in writing, without notice to the Vendor's sureties and without prejudice to any other rights under the agreement or otherwise, terminate the Vendor's right to proceed with the work. Upon receipt of any such written notice of termination of right to proceed, the Vendor shall at its own expense and for that portion of the work affected by any such termination, respond according to the following:

- The Vendor shall assist NERC in making an inventory of all materials and equipment in storage at the Vendor's facility, enroute to the Vendor's facility, in storage or manufacture elsewhere, enroute to NERC and on order from the suppliers.
- The Vendor shall, as NERC designates, assign to NERC any assignable subcontracts and equipment rental agreements.
- The Vendor shall, as directed by NERC, transfer to NERC possession and title of work-in-progress, such as, but not limited to, hardware, software and documentation.

In the event of such termination, NERC may finish the work by whatever method it may deem expedient, including the hiring of another Vendor or Vendors under such form of agreement as NERC may deem advisable; or NERC may itself provide any labor or materials and perform any part of the work. In such case, the Vendor shall not be entitled to receive any further payment until the work is completed. If the unpaid balance of the Vendor's compensation hereunder shall exceed the sum of the expense of finishing the work plus compensation for NERC's additional managerial and administrative services and such other costs and damages as NERC may suffer, such excess shall be paid to the Vendor. If such expense, compensation, costs and damages shall exceed such unpaid balance, the Vendor and its sureties, if any, shall be liable for and shall pay the excess to NERC. Failure of NERC to exercise any of its rights hereunder shall not excuse the Vendor from compliance with the provisions of the agreement nor prejudice the rights of NERC to recover damages for such default.

9.15 Final Acceptance

Final acceptance of the work will occur after NERC's receipt of all final documentation reflecting all changes and corrections. NERC representatives will confirm in writing the acceptance of the work.

9.16 Restrictions

There shall be no restrictions on NERC's use, ownership or transfer of the project results.

9.17 Title

Title and ownership of the project shall pass to NERC upon completion of the project.

If, for any reason, the work is terminated prior to its completion, the title to all portions of the work performed to that time including all project results, whether in the Vendor's possession, in

transit or on NERC's premises, shall immediately pass to NERC unless NERC's notice of termination specifically declines title to all or some of the work.

APPENDIX A –DATA ENTRY RULES

A. General

1. The 2008 TADS spreadsheets have drop-down menus in many fields, but in some cases, a selection from one column may be incompatible with the selections allowed in another column, or “warnings” shall be supplied for suspect data. These are addressed in the “Data Notes” column in the table in Section B. Data that is incompatible or suspect based upon previous entries shall be flagged for Web-based data entry.
2. Except for optional data, all fields require data entry. Missing data need not be flagged during user input, but must be flagged in an error and warning report. See RFP Section 3.4.3.
3. Field formats. The field formats for numeric data are specified on the TADS spreadsheets. Many fields are text fields that allow the user to input an alphanumeric value. Examples include the Transmission Owner Name, the NERC ID, the Outage ID Code, and TO Element Identifier. Allow 80 characters for the Transmission Owner Name and allow 500 characters for the optional Description of Event Type No. 50 on Form 5. Except where specified in Section B, for other text fields, allow only 10 characters. The formatting requirements for Column A on Form 5 (Event ID Code) are described in the table below.

B. Form Specific

Form	Data Notes
1.1 Non-Reporting Transmission Owner Statement	<p>The information on this form may only be entered by REs and edited by REs or NERC. REs will receive Form 1.1 data in a spreadsheet format for data entry.</p> <p>The TO information at the top of the form (NERC ID, Transmission Owner Name, Regional Entity, Country, and Reporting (Calendar) Year) was conceived for spreadsheet use and will be changed. We want this same information. However, we want it be taken from the NERC-provided TO Master Table for the reporting year.</p> <p>An RE would input the TO’s NERC ID and the reporting year. The software would then access the Transmission Owners Name from the TO Master Table. If the TO had facilities in two regions or two countries, drop down menus would provide these choices for the RE to select. Otherwise, the Regional Entity and country would be taken from the TO Master Table.</p> <p>The data on rows 18-28 entered and will be included in the database. For text fields on rows 18-25, allow 50 characters. For telephone numbers allow 17 characters.</p>

Form	Data Notes
<p>1.2 Reporting Transmission Owner Information</p>	<p>The same TO Information described on Form 1.1 above will be entered. Once this data is entered, it will be linked to all other forms which have fields for this same data.</p> <ul style="list-style-type: none"> • Both primary and secondary contacts must be supplied. <p>Form 1.2 requests the “Submission Status” of each form so that we know that the absence of a form is expected and not an error.</p> <ul style="list-style-type: none"> • Form 1.2 is entered three times for the 2008 reporting year, but thereafter only twice: once in the Nov/Dec time frame prior to the reporting year, and once again prior to the end of the Data Entry period for the reporting year. (The first reporting year (2008) has a special additional 1st quarter reporting requirement as discussed in Section 3.4.4.) <ul style="list-style-type: none"> ○ Note that Form 1.2 must be submitted (updated) with each required submission to capture the status of forms that are due after the first submittal. A computer field for Status Revision Date for each submittal shall be manually entered or automatically provided during form data entry. For subsequent submittals, the drop down menus must have the option “NA- form not required at this time” removed. The Vendor could allow a date to be input by NERC that would “gray out” this option for all TOs, or another alternative suggested by the Vendor. ○ If Form 1.2 is not updated for each required submission, an error statement must to be reported. • If a TO selects “Submitted” in column C, the choices for “Reason not Submitted” do not apply and should not be asked. • If Forms 3.1, 3.2, or 3.3 are not reported because “No Elements of this type,” no response is required on corresponding Forms 4.1 and 4.2 (associated with Form 3.1), Form 4.3 (associated with Form 3.2), and Form 4.4 (associated with Form 3.3) since the corresponding forms will not be submitted for the same reason (i.e., “No Elements of this type”) • All of Forms 3.1, 3.2, and 3.3 cannot have “No Elements of this type” selected; otherwise, the TO should have been a non-reporting TO and an error statement must be provided. • Form 3.4 must be submitted at the end of a reporting period: it is required for the special additional 1st quarter report as well as and the end of each reporting year. It does not have an option of “No Elements of this type.” If a TO had no Elements of any type, it is a non-reporting TO. • The only way Form 5 may be omitted is if Forms 4.1, 4.2, 4.3, and 4.4 have either “No Outages” or “No Elements of this type” selected. Otherwise, its omission is in error and an error statement must be provided. Note that “No Elements of this type” cannot be selected for each of Forms 4.1, 4.2, 4.3, or 4.4. If a TO had no Elements of any type, it is a non-reporting TO.

Form	Data Notes
2.1 Ties Lines and Jointly-Owned AC and DC Circuits	<p>The Voltage Classes that are selectable on Form 2.1, column D, shall be four AC Voltages Classes if “AC” is selected in column A, but five DC Voltage Classes if “DC” is selected in column A. (The present construct shows five DC voltage classes, irrespective of whether column D is “AC” or ‘DC.’)</p> <p>On Forms 2.1 and 2.2, the two questions above columns D thru L ask whether the form was updated for additions. For the first question, the “NA- 1st submittal” response shall be grayed out” for subsequent submittals, and only a “yes or “no” will be acceptable. The Vendor may use the same approach for these forms as is used for Form 1.2.</p> <ul style="list-style-type: none"> • If the answer to the first question is “yes,” but “no” is answered on the second question, then an error statement must be provided that instructs the TO to update the form before final submission can be accepted. • If “no” is answered to the first question, no response is required on the second question and it should not be asked. <p>On Forms 2.1 and 2.2, when a NERC ID is entered (for example in columns F or I), use the TO Master Table to populate the TO name data (in this example, corresponding to columns G and J).</p> <p>On Forms 2.1 and 2.2, the NERC ID and reporting TO in columns F and G must be correspond to one of the NERC ID/TO pairs in columns I thru P. Otherwise, an error statement must be provided. The “Reporting TO’s Element Identifier” (Column H) shall allow up to 40 characters for entry of a completely unique identifier.</p>
2.2 Jointly-Owned AC/DC Back-to-Back Converters	<p>See the common issue on the two questions that impact Forms 2.2 and which are discussed in Form 2.1 above.</p> <p>See the common issue on the NERC ID and reporting TO discussed in Form 2.1 above. The “Reporting TO’s Element Identifier” (Column H) shall allow up to 40 characters for entry of a completely unique identifier.</p>
3.1 AC and DC Circuit Inventory Data	<ul style="list-style-type: none"> • In Rows 1-23 • The data in column G must be \leq the data in column F • The data in column K must be \leq the data in column J • The default entries in columns B through K are to be “NA.” This distinguishes from an accidental omission, which is how a non-zero “blank” entry would appear. <p>In Rows 1-18</p> <ul style="list-style-type: none"> • The data in column E must be \leq the data in column D • The data in column I must be \leq the data in column H
3.2 Transformer Inventory Data	<p>In Rows 1-4</p> <ul style="list-style-type: none"> • The data in column D must be \leq the data in column C • • The data in column F must be \leq the data in column E <p>The default entries in columns B thru F are to be “NA.” This distinguishes from an accidental omission, which is how a non-zero “blank” entry would appear.</p>
3.3 AC/DC Back-to-Back Converter Inventory Data	Same comments as Form 3.2 above.

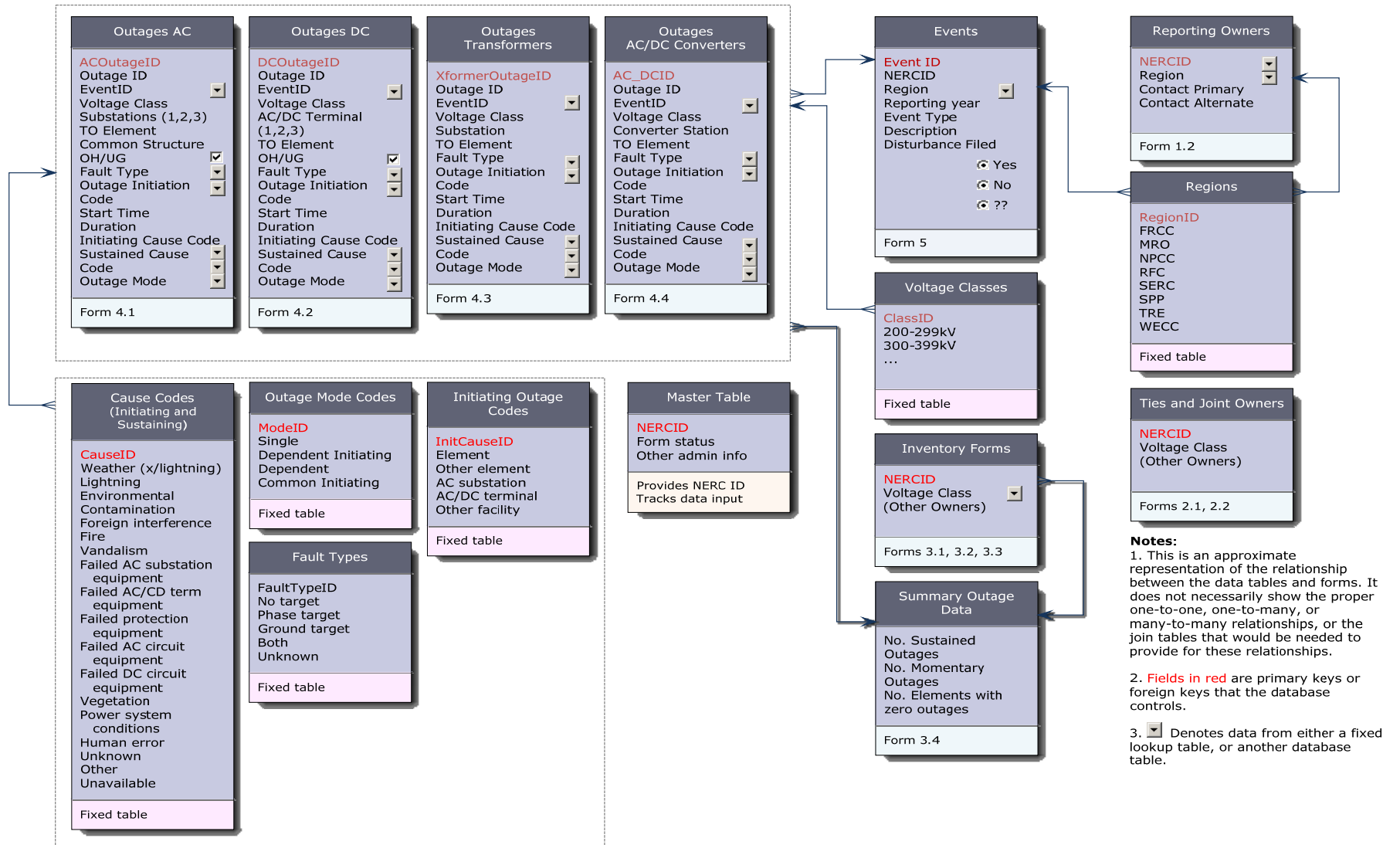
Form	Data Notes
3.4 Summary Outage Data	<p>Columns B and C are entered by the TO based upon data outage data it submitted on Forms 4.1 through 4.4. These shall be verified by the software as correct. For example, if the number of AC Circuit Sustained Outages reported by the TO on Form 4.1 for Voltage Class 200-299 AC Overhead is 10 based upon a software count, but the number reported on column B is 11, an error statement must be provided that states “The number of Sustained (or Momentary) Outages of which are found on Form 4.1 (or the applicable Form) are equal to “X” from an analysis of Form 4.1 (or the applicable from).” The software will provide this value by sorting the appropriate form for the number of outages by category (Sustained/Momentary) and Voltage Class. [Note: Column B and C were originally conceived as a “self-check” of the data entered on Forms 4.1 and 4.4. These columns may be eliminated in a later version of the TADS workbook.]</p> <p>The value in Column D cannot exceed the value in Column B on Forms 3.1, 3.2, and 3.3 for the associated Voltage Class. If this occurs, an error statement must be provided.</p>
4.1 AC Circuit Detailed Automatic Outage Data	<p>Column A: For each TO entity (each NERC ID code), the Outage ID Code must be unique and not replicated on any other outage reporting form (4.1-4.4) for the reporting year. If it is not unique, provide an error report and the Form No. (4.1, 4.2, 4.3, or 4.4) where the duplicate Outage ID is entered. This information that will allow the TO to correct the entry. Allow up to 20 characters for entry of a completely unique identifier.</p> <p>Column B: Provide an Event ID Code options menu from those Event ID Codes on Form 5 <i>unless</i> the Outage Start Time in Column L is entered as a “9999.” In this case, the Event ID Code will be the same one associated with the same Outage Identification Code in a previous year. (The four digits after the hyphen in the Event ID Code indicate the reporting year that the code was used). Also, since this is a continuing outage, the Event ID Code/Outage ID Code combination must be found in the previous reporting year. If the Event ID Code/Outage ID Code combination cannot be verified, provide an error statement.</p> <p><u>Additional relationships for the development of an Event ID Code menu:</u></p> <ul style="list-style-type: none"> • Any Event ID Code associated with an Event Type No. 10 or 20 can only be used once. Therefore, eliminate these from the choices if they have been entered previously on any of Forms 4.1, 4.2, or 4.3. • The only Event ID Code option for an outage associated with AC/DC Back-to-Back Converters (Form 4.4) can only be one that has an Event Type 50. <p>See the comments on Form 5 for more error checking of Event ID Codes.</p> <p>Note: The combination of a TOs’ NERC ID, the Outage ID, the Event ID, and the reporting year is a unique identifier for a specific TO outage.</p> <p>Columns D, E, and F: Names must be in D and E (for a two terminal line) <i>or</i> D, E, and F (for a three terminal line). If names are entered in any other combination (i.e., D and F only or E and F only) provide an error statement that asks the TO to use the station name columns sequentially.</p> <p>Column G: This is an optional field. No entry is required. Allow up to 40 characters for entry of a completely unique identifier.</p> <p>Column I: This flag will have a default value of zero. If the flag is set to “1,” provide a warning statement if column H is selected as “UG.” The definition of UG versus OH is based upon the predominate characteristic of the circuit. Therefore, it is possible to have an outage on a circuit that’s on a common OH structure, but the circuit itself is classified as “UG.”</p> <p>Column J and Column K: Fault Type (col. J) and Outage Initiation Code (col. K) are related.</p> <ul style="list-style-type: none"> • Warn the user if the Fault Type selected is not “None- no fault occurred” and the Outage Initiation Code is not “Element-Initiated. The Fault Type only applies to the Element being reported. The warning should say something like “Are you sure a fault

Form	Data Notes
	<p>occurred on the reported Element?"</p> <p>Column L:</p> <ul style="list-style-type: none"> • Do not allow an entry date/time that is beyond the current date or time (i.e., no future outages can be entered). Remember that all time is on a UTC standard. • If column L has a "9999" entered and the Event ID Code has a year entry (four digits after the hyphen) equal to the previous year, this combination indicates that the outaged Element started its outage in the previous year and is returning to service in the reporting year. The user will input a duration that is calculated as if the outage commenced on January 1, 00:00 UTC for the annual submittal. <p>Column M:</p> <ul style="list-style-type: none"> • If the duration, when added to the Outage Start Time, extends beyond the end of the reporting period, provide an error message. • If Column M has a "9999" entry, the software will calculate the outage duration from the Outage Start Time until the end of the reporting period. • If both Column L and M have a "9999" in them, this is an outage that spans more than two reporting years. The software will calculate the Outage Duration equal to the duration of the reporting year. <p>See Section 4.1 of the Manual for a complete discussion of the treatment of outages that span more than one reporting period.</p> <p>Momentary Outages (Column M, N, and O): If column M has a "zero" outage duration input, it is a Momentary Outage. An Initiating Cause Code is required, and "Unavailable" is not a valid option (although it is allowed in the current spreadsheet which is not interactive.) Also, a Sustained Cause Code entry is not to be allowed for Momentary Outages.</p> <p>Sustained Outages (Columns M, N, and O): If column M is one minute or greater, it is a Sustained Outage. Cause Codes are required in both columns N and O. However, the "Unavailable" code can only be selected for column O. (The current spreadsheet does not have the interactive logic described above.) The use of the "Unavailable" Cause Code is discussed in the Definitions on pages 9 and 12. It will only be allowed in 2008.</p> <p>Column P:</p> <ul style="list-style-type: none"> • If a Dependent Mode Initiating or a Common Mode Initiating code is selected, a second Dependent Mode outage with the same Event ID Code must be present on one of Forms 4.1, 4.2, 4.3, or 4.4 in the same reporting year. Provide an error report <i>unless</i> the Event ID Code of the outage is from a prior year and the Outage Start Time in column L is a "9999."
4.2 DC Circuit Detailed Automatic Outage Data	Same as Form 4.1, except that comments related to column I do not apply.
4.3 Transformer Detailed Automatic Outage Data	Same as Form 4.1, except that comments related to columns E, F, H, and I do not apply.
4.4 AC/DC Back-to-Back Converter Detailed Automatic Outage Data	Same as Form 4.1, except that comments related to columns E, F, H, and I do not apply.
5 Event ID Code and Event Type Number Data	<p>Column A</p> <ul style="list-style-type: none"> • This column has "two" data entries that are separated by a hyphen: the field to the left of the hyphen is the TOs own unique code. Allow 15 characters for it. However, the field to the right of the hyphen is the reporting year. (For 1st quarter submission in 2008, use "2008" and not "2008Q1" so that the 1st quarter data can be used for the 2008 annual submission). The reporting year will be automatically entered by the

Form	Data Notes
	<p>software. Allow a total field width of 20 characters.</p> <ul style="list-style-type: none"> • On a TO basis, each Event ID must be unique and not replicated for a reporting year. If an Event ID is not unique, provide an error report and the data from columns A through D on the TO’s Form 5 that contains the duplicate Event ID. <p>Column B and Form 4.1 through 4.4 interactions:</p> <ul style="list-style-type: none"> • 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." If this is not the case, provide an error statement. • An Event Type No. 50 must used for an outage of an AC/DC Back-to-Back Converter (Form 4.4); if not, provide an error statement. • Event Type No. 30 and 40 only apply to AC and DC Circuits, respectively, on common structures. If Type No. 30 is selected for an Event ID Code that is used for an outage of a DC Circuit or a Transformer, or an AC/DC BTB Converter, provide an error statement. If Type No. 40 is used for an Event ID Code that is selected for the outage of an AC Circuit, a Transformer, or an AC/DC BTB Converter, provide an error statement. (Note that although AC/DC BTB Converters are included, the previous discussion on AC/DC BTB Converters requires that they have an Event Type 50 only.) • The application of Event Types 30 and 40 requires two outages. Provide an error statement if the Event ID Code using an Event Type No. 30 or 40 only applies to one outage or more than two outages. <ul style="list-style-type: none"> ○ An exception to the two outage rule is for an AC Circuit that is on a common structure with another AC circuit owned by a different TO. If the “AC Multi-Owner Common Structure Flag on Form 4.1, column I is equal to one (1), do not report an error if Event Type No. 30 is used for the Event ID Code. • The two Event Type No. 30 or 40 outages for a must have either of these Outage Initiation Codes (column K on Forms 4.1 and 4.2): Element-Initiated <i>or</i> Other Element-Initiated. Provide an error statement if the two outages using an Event ID Code that has an Event Type No. of 30 or 40 does not have these Outage Initiation Codes. <ul style="list-style-type: none"> ○ See the exception above regarding the “AC Multi-Owner Common Structure Flag.” • Event Type No. 30 or 40 outages must have one of the following pairs of Outage Mode Codes: (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); if not, provide an error statement. <ul style="list-style-type: none"> ○ See the exception above regarding the “AC Multi-Owner Common Structure Flag.”
Other data interactions	<ul style="list-style-type: none"> • The type of facilities for which outages are reported must have corresponding inventory entries on Forms 3.1, 3.2, and 3.3. As an example, if a DC Circuit outage is reported Form 4.1 in a Voltage Class 600-700 kV, but not DC Circuits of this type are reported on Form 3.1, provide an error report that provides the Outage ID Code and the form no. and states that “The inventory data on Form [3.1, 3.2, or 3.3] does not contain facilities described by the outage.”

APPENDIX B –DATA RELATIONSHIPS

NERC TADS Forms Data Relationships of Reporting Transmission Owners



APPENDIX C –CONFIDENCE INTERVALS FOR MEANS

For the computation of MTTR, a 90% confidence interval will be calculated. Confidence intervals depend upon the number of data values (N) used in the calculation. For an MTTR confidence interval calculation, N is the number of outages. Two sets of formulas are provided: One set for N is ≥ 30 , and a second set for $N < 30$.

a. $N \geq 30$

$$\sigma_M = \frac{\text{Standard deviation, or } \sigma}{(N)^{1/2}}$$

The standard deviation, σ , is calculated as follows:

1. First calculate the estimate of the mean, $M = [\sum \text{Data value (i)}]/N$
 - For MTTR, the “data value (i)” for each outage is equal to its outage duration.
2. Next calculate an estimate of the standard deviation:

$$\sigma = [(1/(N-1) \times (\sum (\text{Data value (i)} - M)^2)]^{1/2}$$

The “true” mean, with 90% confidence, is equal to the $M \pm 1.645 \times \sigma_M$

b. $N < 30$

The same calculations for M and σ are made. The true mean 90% confidence interval, M, has a different formula:

$$\text{True mean} = M \pm t \times \sigma/(N-1)^{1/2}$$

A value of “t” is determined by a look-up, which depends upon the value on N-1. A table of “t” values for a 90% confidence interval for N-1 values from 1 through 29 is provided on the next page.

N-1	t
29	1.699
28	1.701
27	1.703
26	1.706
25	1.708
24	1.711
23	1.714
22	1.717
21	1.721
20	1.725
19	1.729
18	1.734
17	1.740
16	1.746
15	1.753
14	1.761
13	1.771
12	1.782
11	1.796
10	1.812
9	1.833
8	1.860
7	1.895
6	1.943
5	2.015
5	2.132
3	2.353
2	2.920
1	6.314