NERC

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Wind Generation Data Entry

Software User Manual

Effective January 2009

to ensure the reliability of the bulk power system

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Section 1 – Installation, Execution, and Updating

This section describes the procedures for installing and executing the WindGen Data Manager application.

Follow the steps detailed below to install the WindGen Data Manager application.

Downloading and Executing WindGen Software

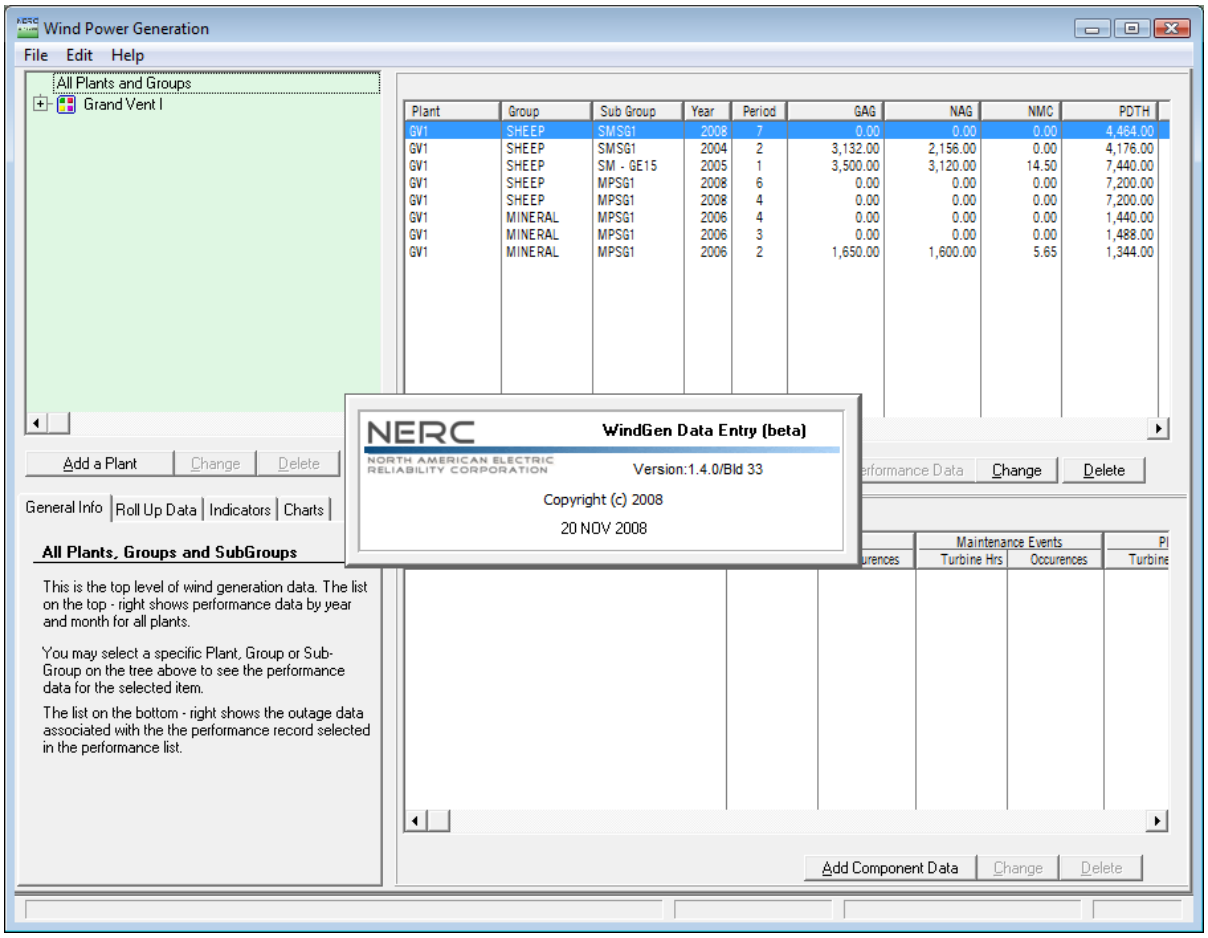
Follow the instructions detailed below to download and install the WindGen Data Manager software.

1. Open your web browser and enter the URL http://www.nerc.com/page.php?cid=4|43|46
2. Click **GADS Wind Generation Data Entry**.
3. Click on the zip file **Wind Generation Data Entry Software**.
4. Click the **Save** button to save the file to a directory of your choice. Click **Close**.
5. Go to the directory where the file was saved, open the zip file, then double click on the install file (su_WindGen09.exe).
6. Click **Run**. Click **Next** when the welcome window for the Wind Power Generation Data Manager 09 Setup Wizard is displayed.
7. Enter **6aviators** in the Password field then click **Next**. The Custom Setup window is displayed.
8. Select the features you wish to install. Install Test Data will be selected with a green check. If it's not selected, click the checkbox to select it. Click **Next** to continue.
9. The default directory where the software will be installed is shown. If you would like to install the software in a different directory, click **Change**.
10. Click **Next**. The current settings are displayed.
11. Click **Next** to start the installation.

    The installation is complete.
12. To run the program directly after finishing the setup, check the box next to Launch WindGen after install. Deselecting the box will close the Setup Wizard without launching the program.
13. Click **Finish.**

If the Launch WindGen after install was not checked, the Windows desktop is displayed. The WindGen Data Manager can be run by double clicking My Computer and selecting the drive and directory into which it was installed.

If the checkbox was checked, the main Wind Power Generation application window is displayed, as illustrated below.



After a few seconds, the NERC logo disappears.

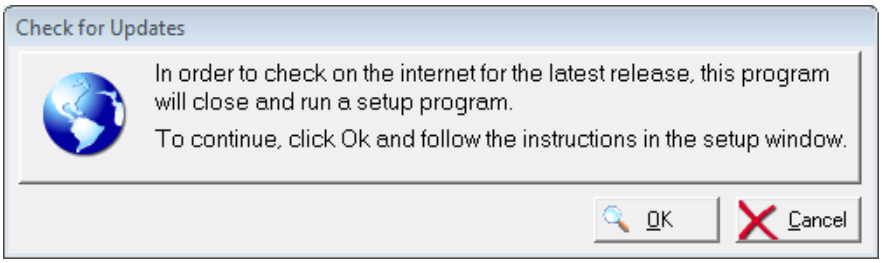
Updating WindGen Data Manager

Follow the steps detailed below to check for, and install any available updates to the Wind Power Generation software.

1 Open the Wind Power Generation program.

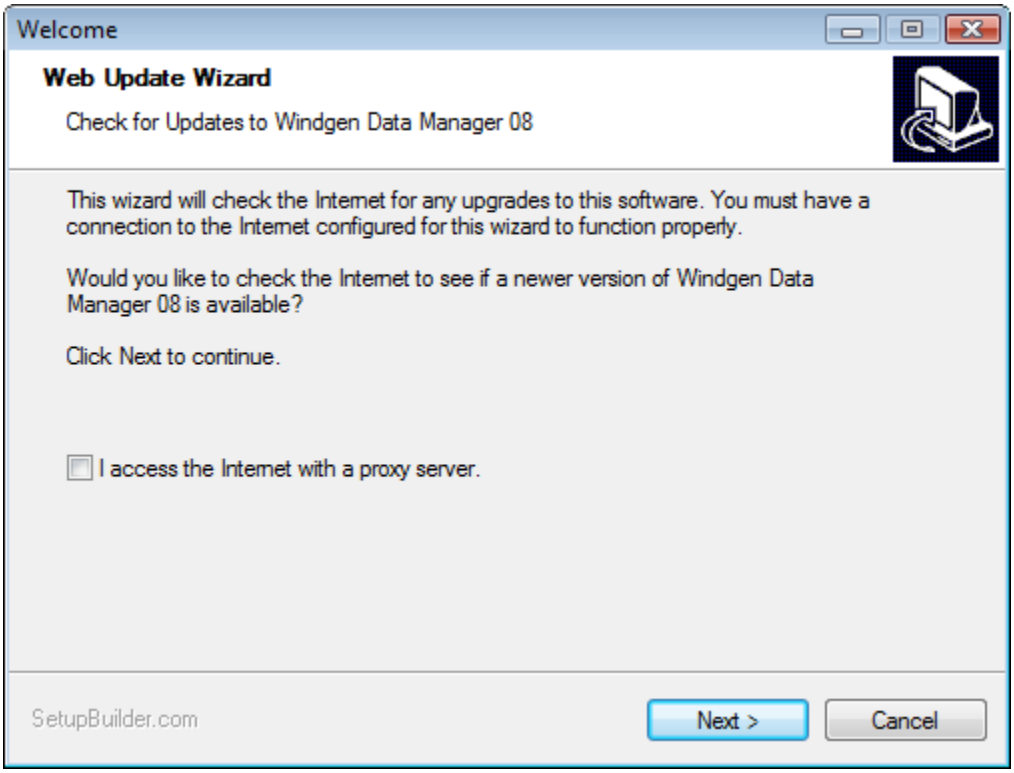
2 From the File menu, choose **Check for Updates**.

The Check for Updates window is displayed, as illustrated below.



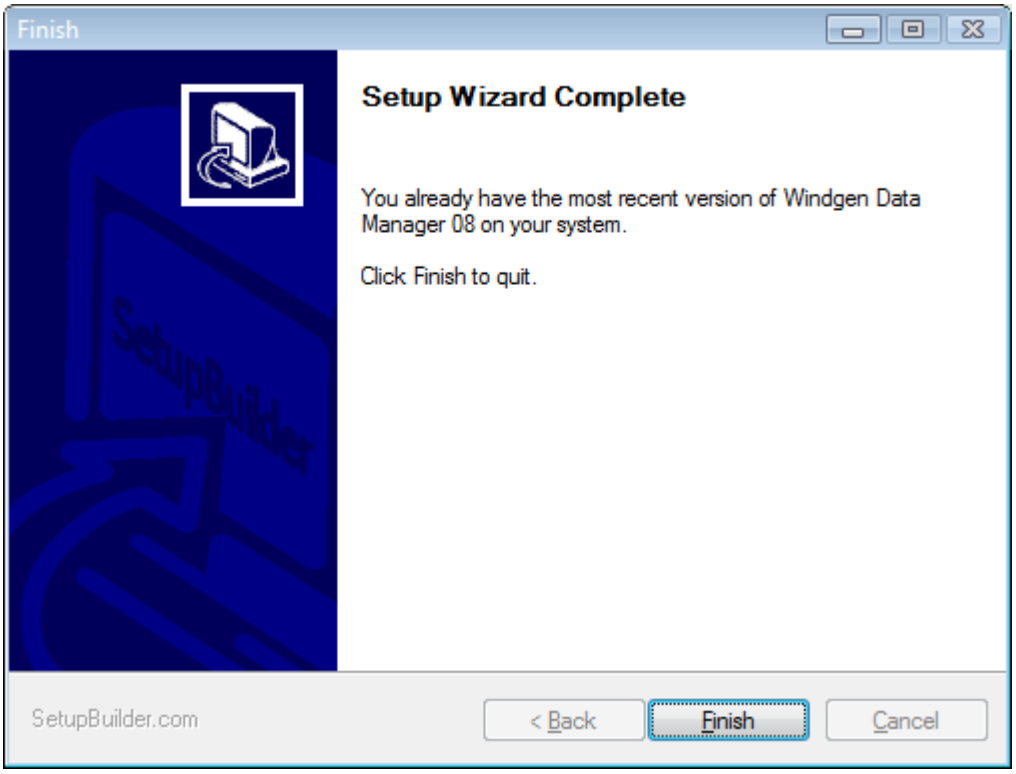
3 Click **OK** to continue.

4 The Web Update Wizard is displayed, as illustrated below.

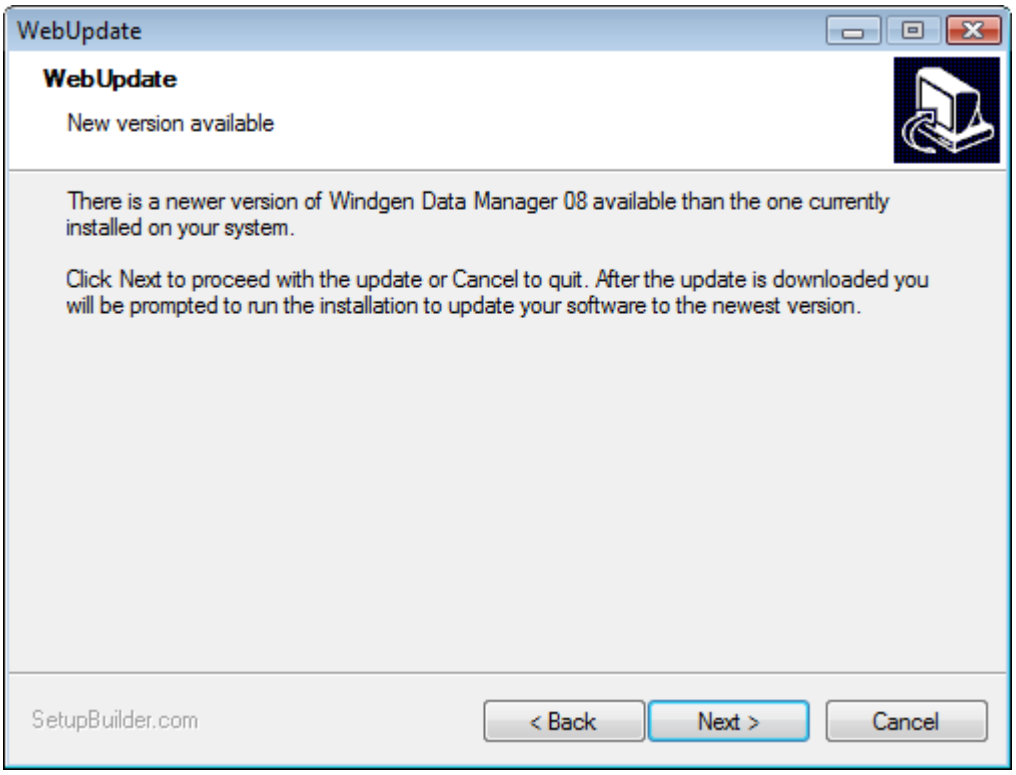


Click **Next** to continue checking for updates.

5 If there is no new version to download, a Setup Wizard Complete window is displayed, relating that you already have the most recent version of WindGen Data Manager 08 on your system, as illustrated below.



6 If there is a new version to download, the New version available message will be displayed, as illustrated below.



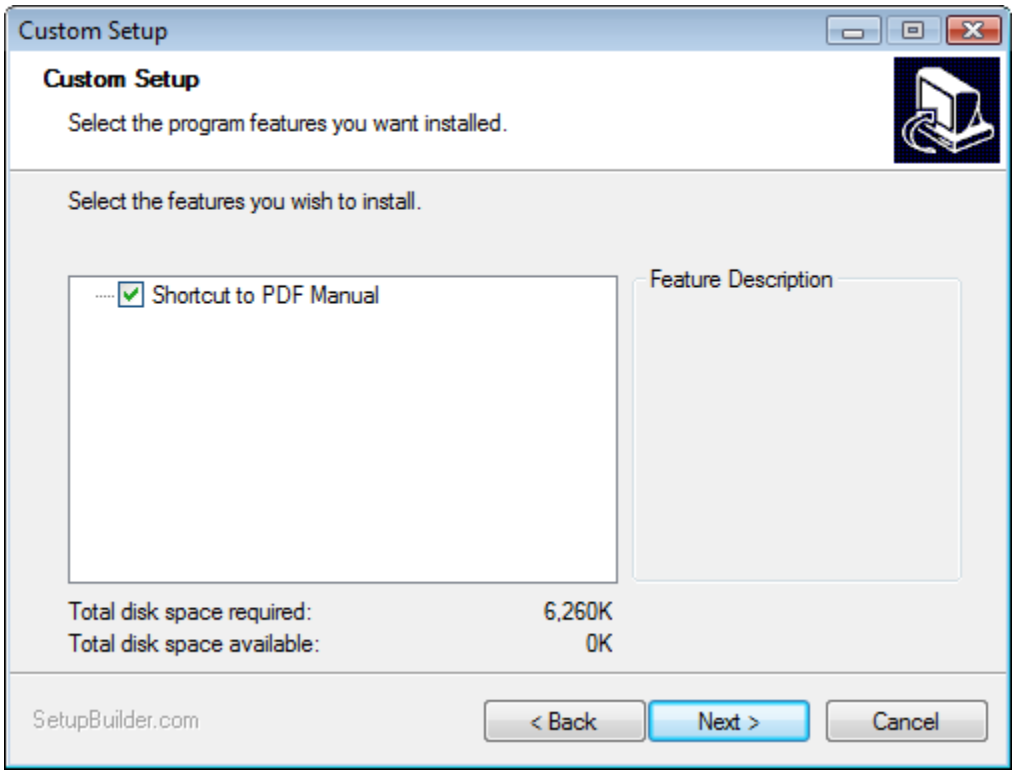
7 Click **Next >** to continue the installation of the update.

8 Once the download is complete, the Setup Wizard is displayed, as illustrated below.

9 Click **Next >** to continue.

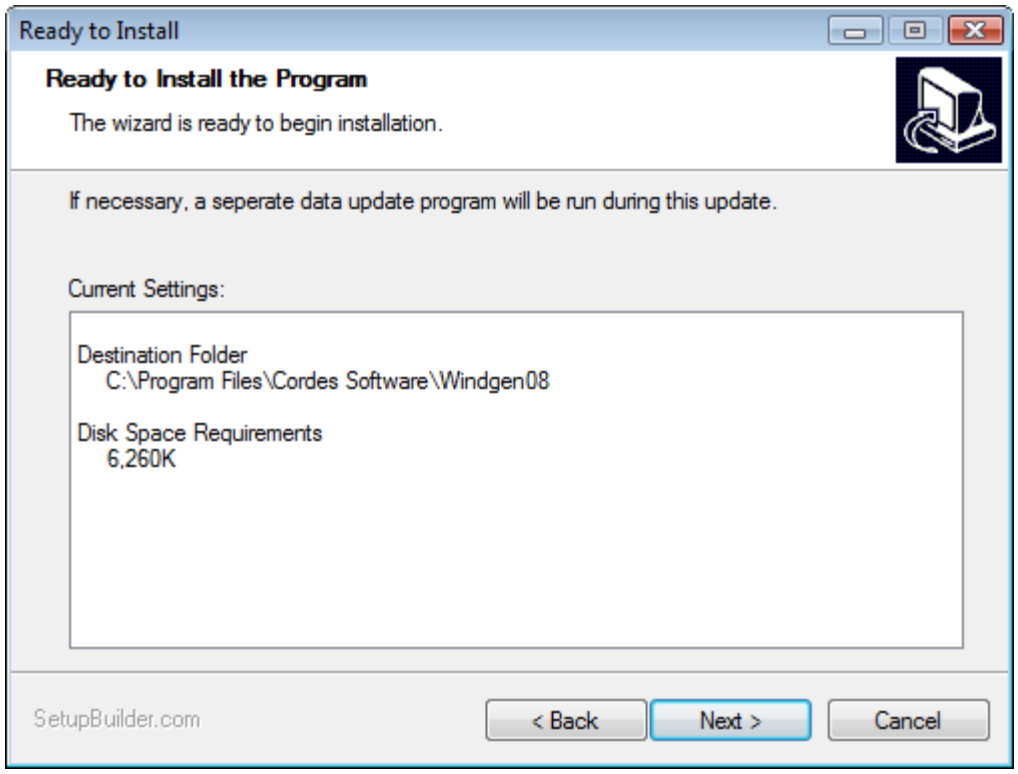
10 Enter the password **6aviators** in the Password field then click **Next >**.

11 The Custom Setup window is displayed, as illustrated below.



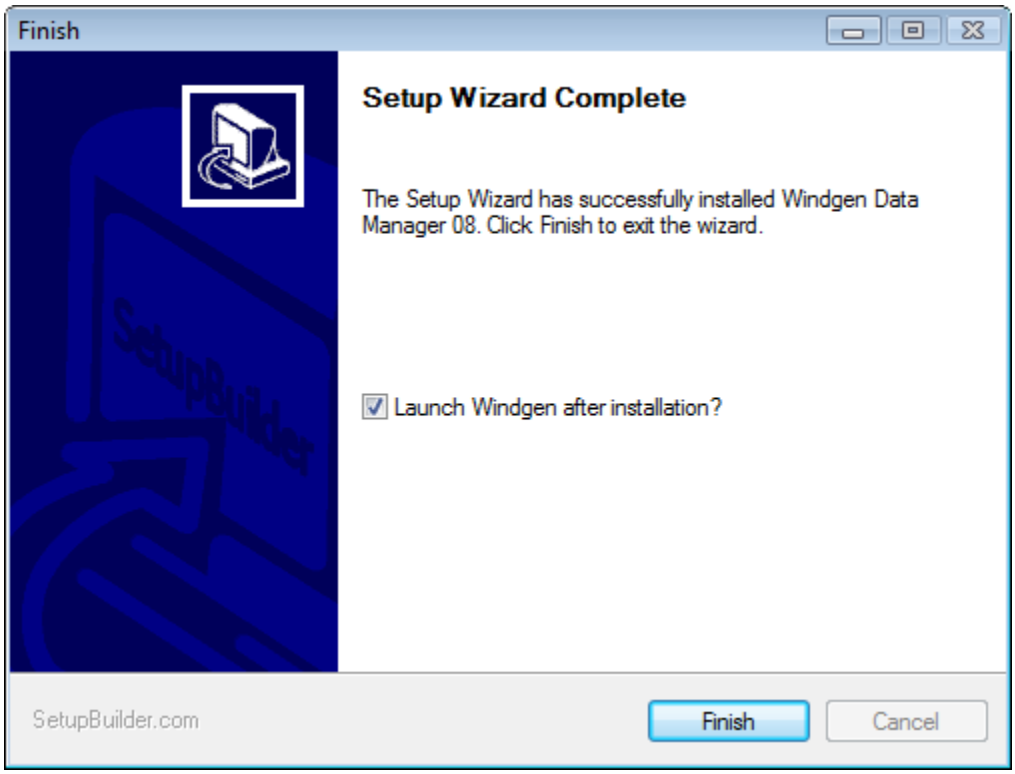
The user may choose features to install. Check the boxes of the features that will be installed then click **Next >** to continue.

12 The Ready to Install window is displayed, as illustrated below.



13 Click **Next** > to continue the installation.

The Setup Wizard Complete message is displayed, as illustrated below.



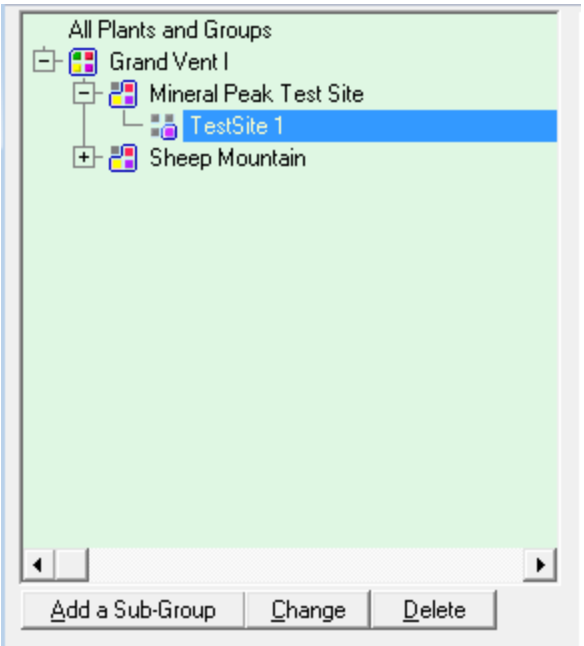
14 To launch the WindGen program after installation, check the checkbox then click Finish. The Wind Power Generation main window is displayed.

Section 2 – Overview

The main window of the Wind Power Generation program is broken down into four panels of information. The following sections will briefly detail each of the four panels.

Group Hierarchy

The panel at the upper left of the main window displays the group hierarchy in tree form, as illustrated below.

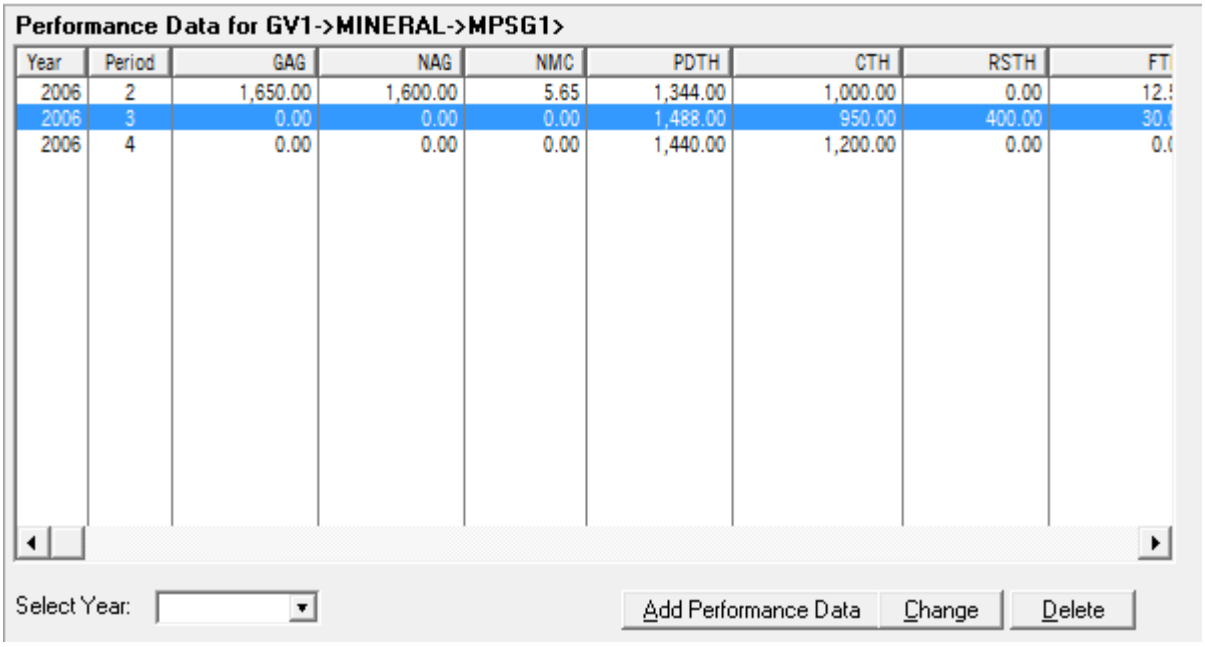


By clicking on the + or – boxes, each plant and group can be expanded or collapsed.

Adding a new plant, group, or sub-group, or changing or deleting an existing plant, group, or sub-group, can also be done from this panel.

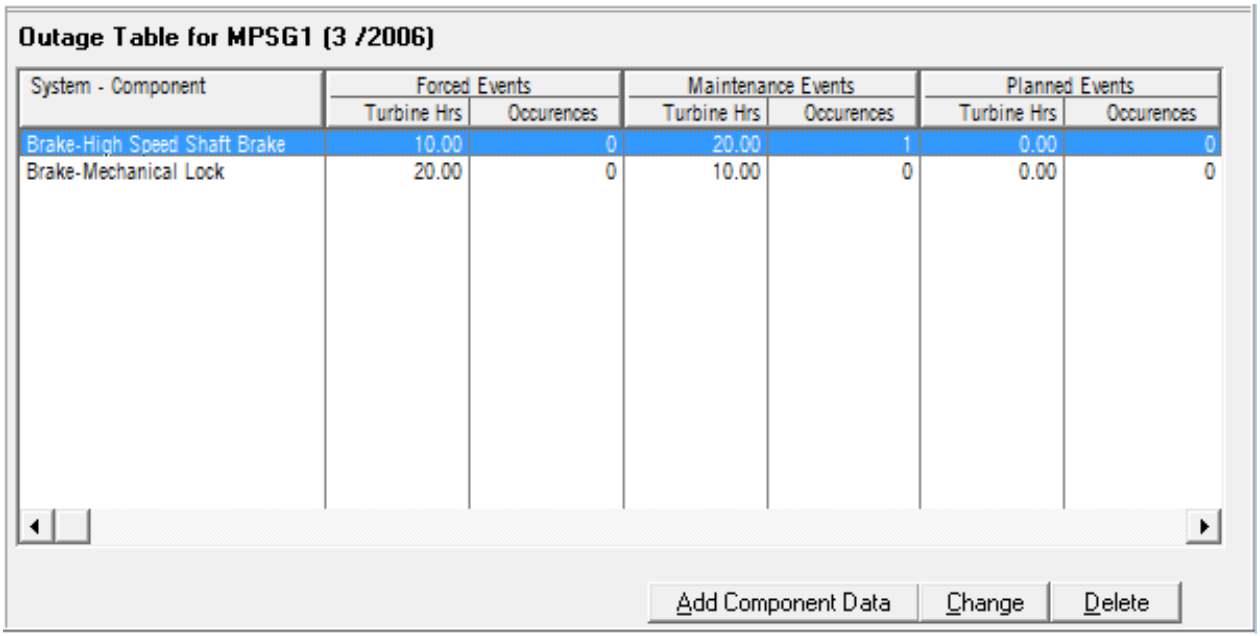
Performance Data

The panel at the upper right of the main window displays the performance data of all the periods for the plant, group, or sub-group that is selected in the group hierarchy tree. In the following example, the performance data of all periods in the sub-groups under the Sheep Mountain group is shown.



Outage Table

The panel in the lower right of the main window displays the outage data of the period selected in the Performance Data panel. In the following example, the outage data for Period 1 of the SM – GE15 sub-group under the Sheep Mountain group is shown.

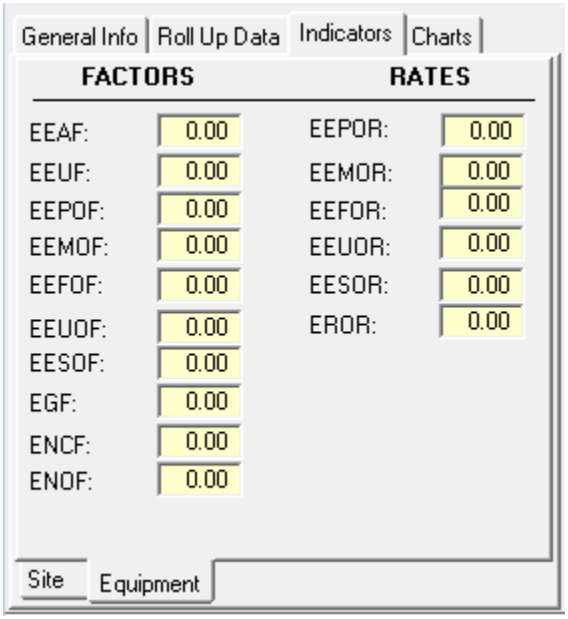


General Info

The panel in the lower left of the main window displays a tabbed window. Each tab is listed and briefly described below.

- The General Info tab displays basic information on the plant, group, or sub-group that is selected in the Group Hierarchy pane.
- The Roll-Up Data tab displays the cumulative amounts in each data field for all periods displayed in the Performance Data pane.
- The Indicators tab can show two types of information, Site and Equipment.
- The Charts tab displays one of two different charts. The first chart, selected by clicking the Hours tab at the bottom of the panel, displays a pie graph of Active Turbine-Hours.

  The second chart, shown by clicking the % Generation tab at the bottom of the panel, displays a stacked bar chart showing the % to total installed capacity.



Section 3 – Menu Bar

The following items are shown on the menu bar of the main window:

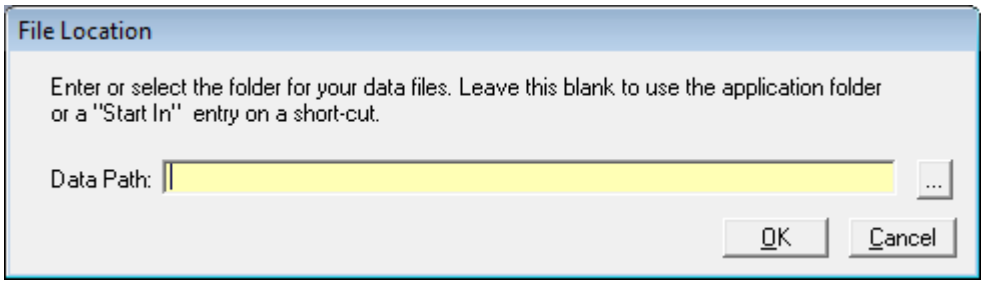
Menu	Description		
File	This menu contains the following options:		
	Print Setup…	This option displays the Print Setup dialog box. This is a standard Windows dialog box from which a printer can be selected, and print options set.	
	Set File Locations	This option allows the user to set the folder in which the data is located.	
	Open	If the main window is closed, this option will open the main window.	
	Import Data	This option allows the user to import existing data into the program.	
	Export Data	This option allows the user to export entered data to a selected location.	
	Check for Updates	This option will check for any updated versions of the program via the internet and will open an update wizard.	
	Exit	This option will close the program	
Edit	This menu contains the following options:		
	Cut	This option will cut a highlighted entry.	
	Copy	This option will copy a highlighted entry.	
	Paste	This option will paste the first previously cut or copied entry into the selected field.	
	Options	This option contains the following sub-options under Information Panel:	
		Charts Tab	When this option is checked, the Charts tab on the General Information panel will be displayed and you may view the charts. When this option is unchecked, the Charts tab on the General Information panel will not be displayed.
		Use Live Rollup	Selecting this option will automatically update the Data and Charts in the lower left panel in response to the entries that are selected or displayed in the Performance panel.
		Alt Chart Colors	Selecting this option will change the color scheme of the charts.
Help	This menu contains the following options:		
	Help	This option will open the content of the Help File.	
	Search Help	This option will open the index of the Help File.	
	About	This option will show, for a brief time, the specifications of the program.	

The following sections will further explain how to utilize some of the options found in File menu of the Menu Bar.

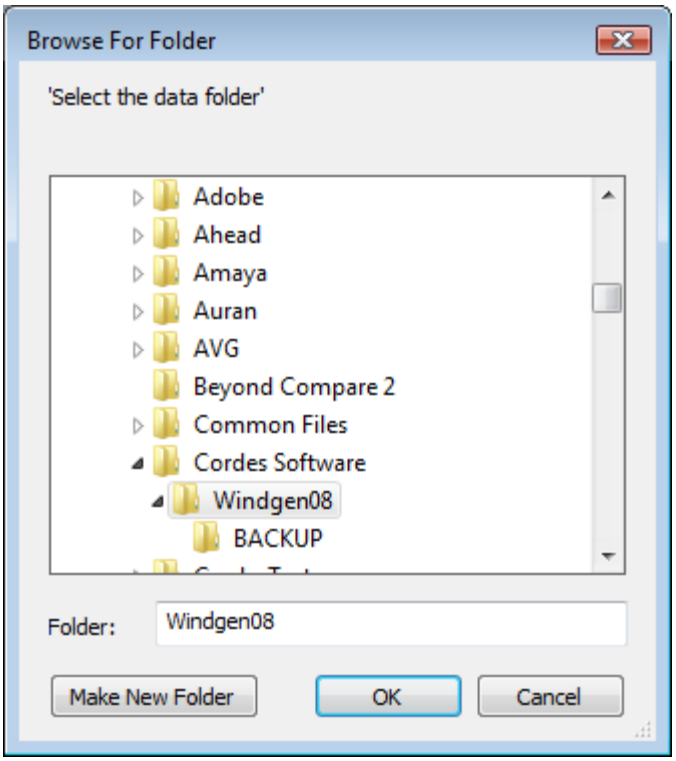
Set File Locations

Follow the instructions detailed below to set file locations.

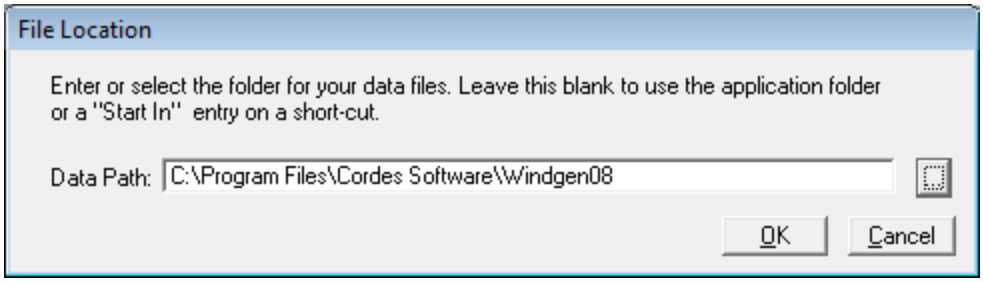
1 Click the Set File Locations option from the File Menu. The File Location window is displayed, as illustrated below.



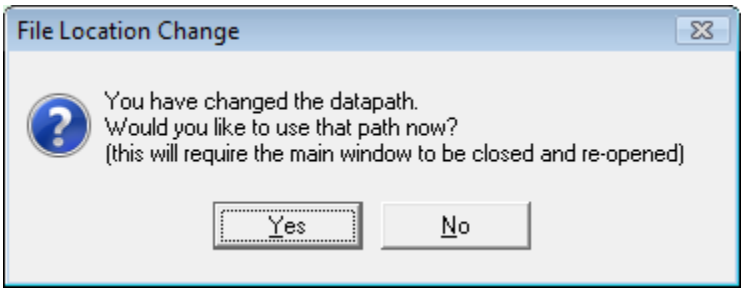
2 Click the button to the right of the Data Path field to choose a directory for your data files. The Browse for Folder window is displayed, as illustrated below.



3 Select the desired folder then click **OK**. The chosen folder is displayed in the Data Path field as illustrated below.



4 Click **OK**. A File Location Change message will be displayed, as illustrated below.

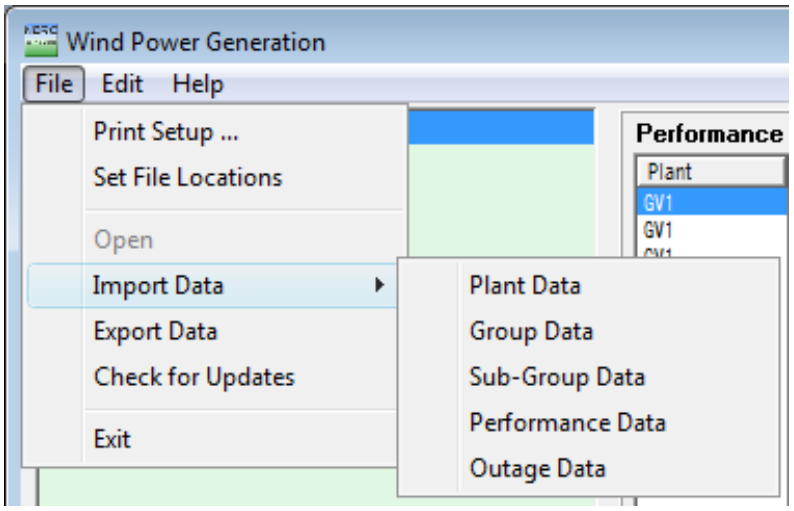


5 Click **Yes** to continue. The chosen path will be the directory from which the program loads the data.

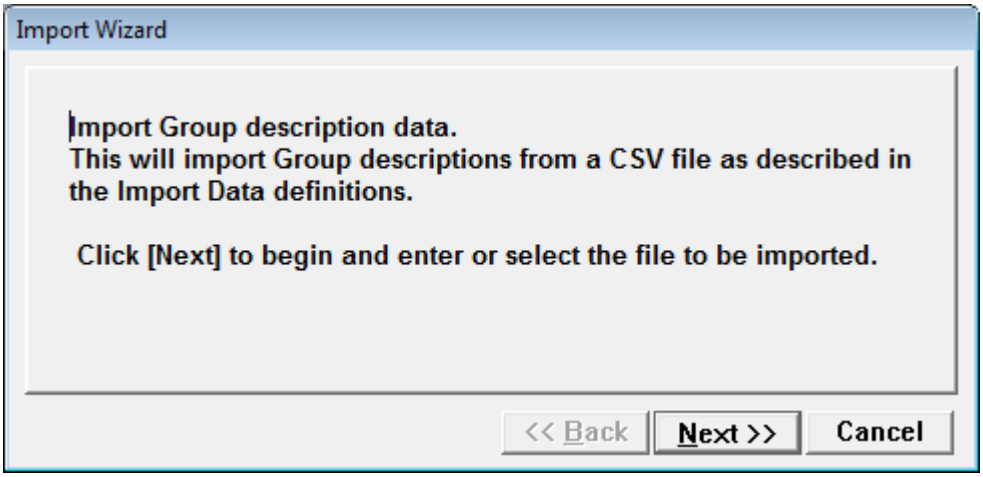
Import Data

Follow the instructions detailed below to import data.

1 Click on File on the Menu Bar of the main window. Move the cursor over Import Data to display the sub-menu, as illustrated below.

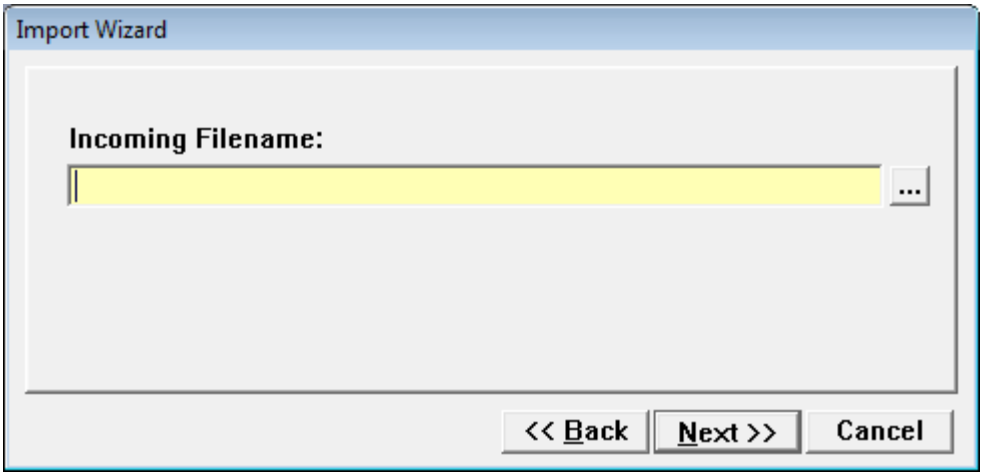


2 Click on the type of data you wish to import. After the type of data is selected, an Import Wizard window is displayed, as illustrated below.



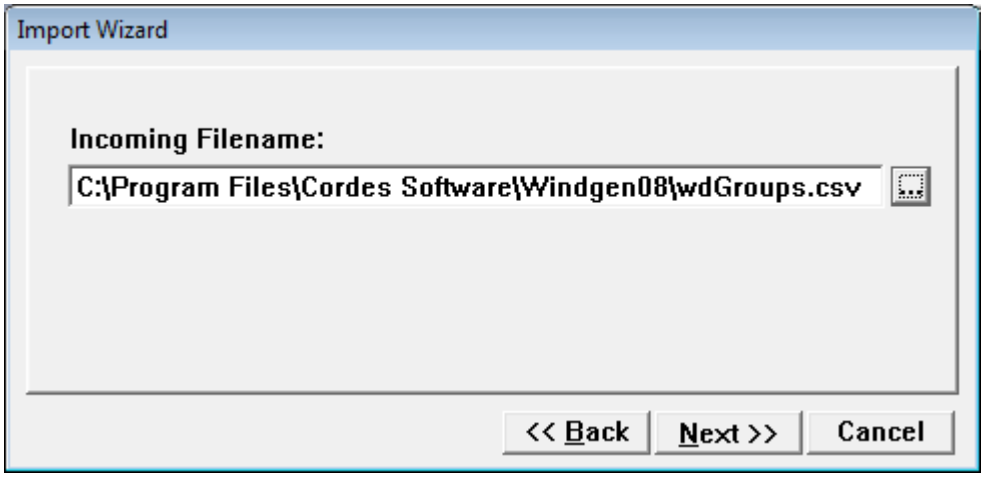
The above example shows importing Group data

3 Click **Next>>**. The Import Wizard continues and displays a window allowing the user to type in, or choose from a directory, the file to import, as illustrated below.

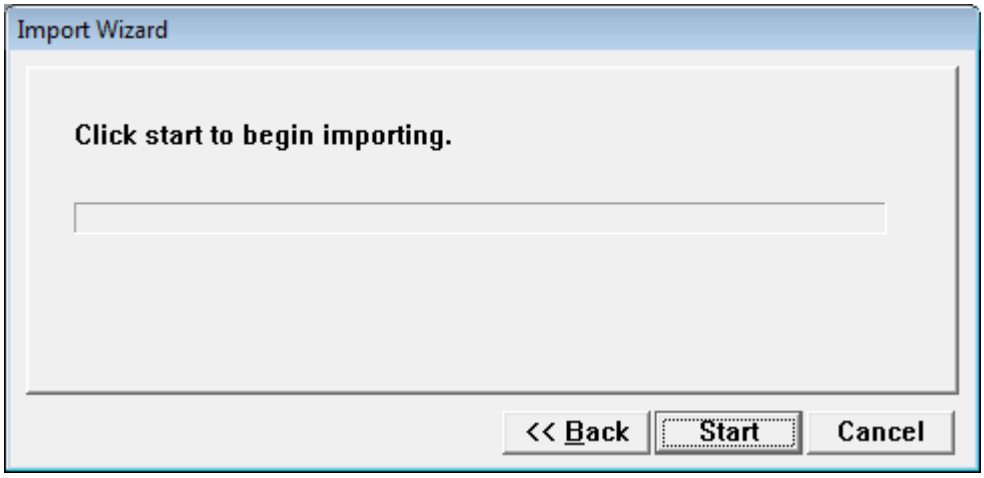


***Note –** Make sure that the file you are importing corresponds to the type of file you chose to import. For example, if you clicked to import Group Data, the imported file should be a CSV file of Group data. For more information about CSV files, please refer to *Appendix A – CSV Files* beginning on page 67 of this manual.

4 Click on the button to the right of the Incoming Filename field. Select the file you wish to import. The file name will be displayed in the Incoming Filename field as illustrated below.



5 Click **Next>>.** The next window of the Import Wizard is displayed as illustrated below.



6 Click **Start** to begin importing. Once the import is complete and there are no errors, a message will be displayed as illustrated below.

The imported data is available in the program.

If there is an error in the file, a message will be displayed as illustrated below.

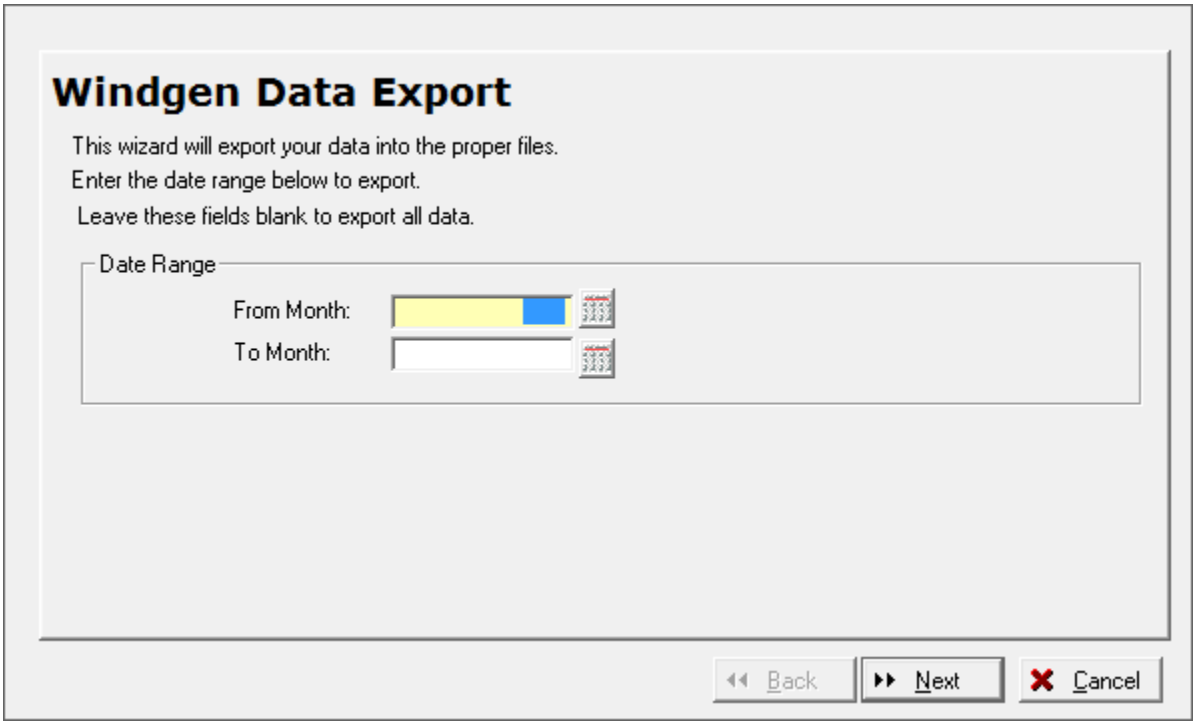
The errors may be due to errors in the file itself, or you may have chosen to import the wrong file. In the case of having errors, the data will not be available in the program. For more information on possible errors that may be found, see *Appendix B – Import Errors*

beginning on page 83.

Export Data

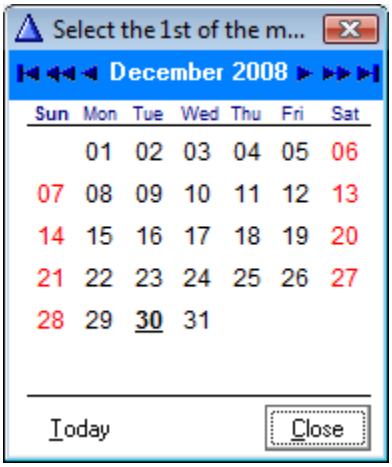
Follow the instructions detailed below to export data.

1 Click on Export Data from the File menu on the Menu Bar. The Windgen Data Export window is displayed as illustrated below.

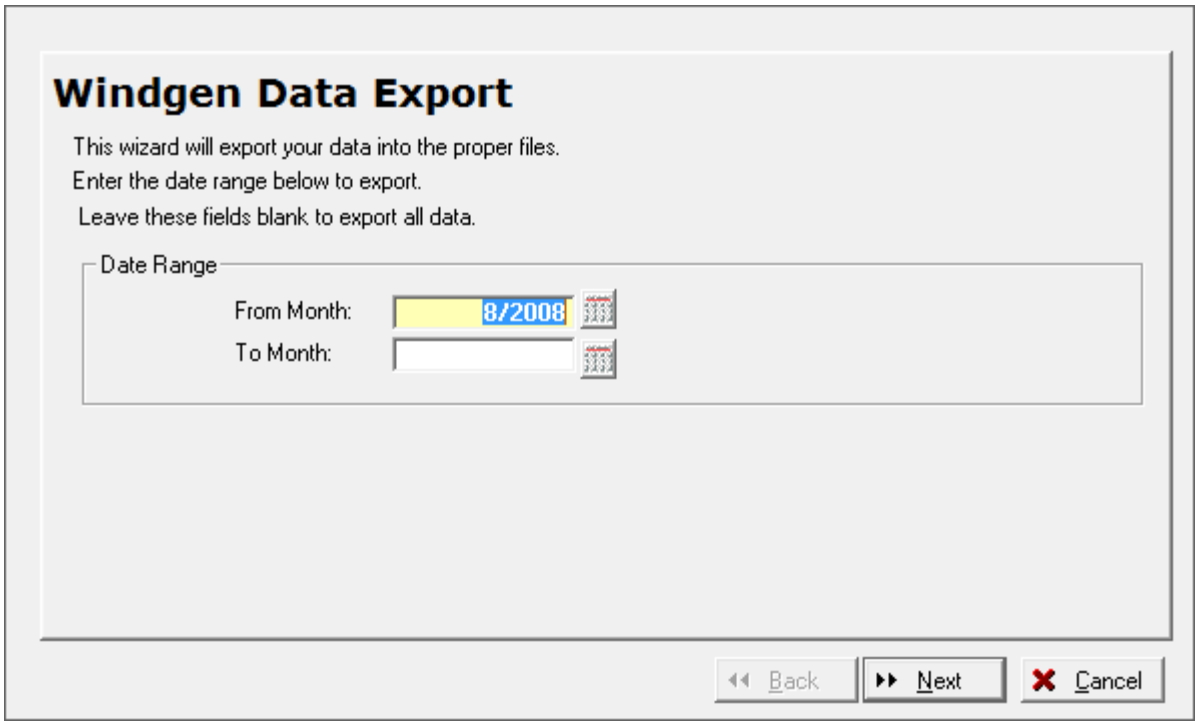


2 In the From Month field, enter the first month and year (MM/YYYY) of the date range you wish to export data from.

You may also click the button to the right of the field. A calendar will be displayed as illustrated below.



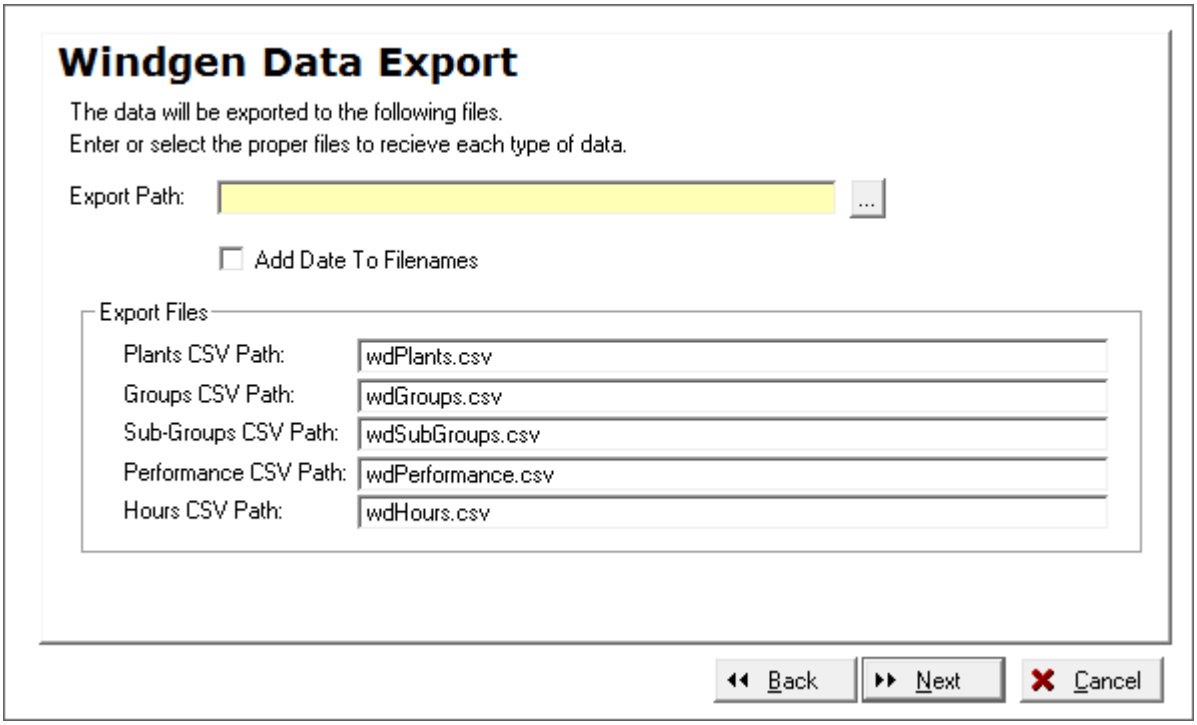
Use the arrows at the top of the calendar window to choose the start month of the date range you wish to export data from. The month and year will be displayed in the From Month field as illustrated below.



3 Repeat step 2 to select an end month of the date range you wish to export data from.

If you wish to export all available data, do not enter a date range.

4 Click **Next** to continue the export process. The Data Export window is displayed as illustrated below.



5 Default file names will be displayed in each data-type field. To differentiate between exported files, you may choose to add the current date to the end of the file name by clicking the check box next to Add Date To Filenames.

Click the button to the right of the Export Path field to choose a directory to which the data will be exported to.

6 Click **Next** to continue the export process. The data export window is displayed as illustrated below.

7 Click **OK** to begin the export. The selected time frame of data will be exported as the displayed CSV files to the selected directory.

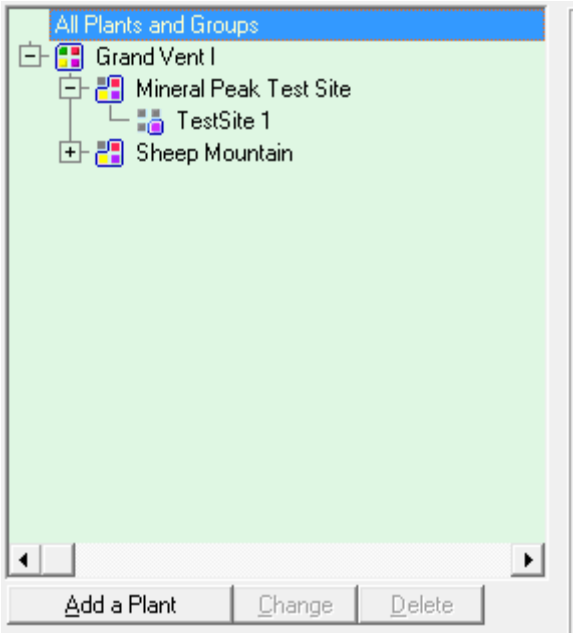
Section 4 – Editing Plants, Groups, and Sub-Groups

This section will detail how to add, change, and delete plants, groups, and sub-groups. This must be done in hierarchical order. In other words, you cannot add a Group without having a Plant to add it to; you cannot add a Sub-Group without first having a Group to add it to; you cannot add Performance Data without first having a Sub-Group to add it to. Performance Data is added to Sub-Groups; Sub-Groups are added to Groups, and Groups are added to Plants.

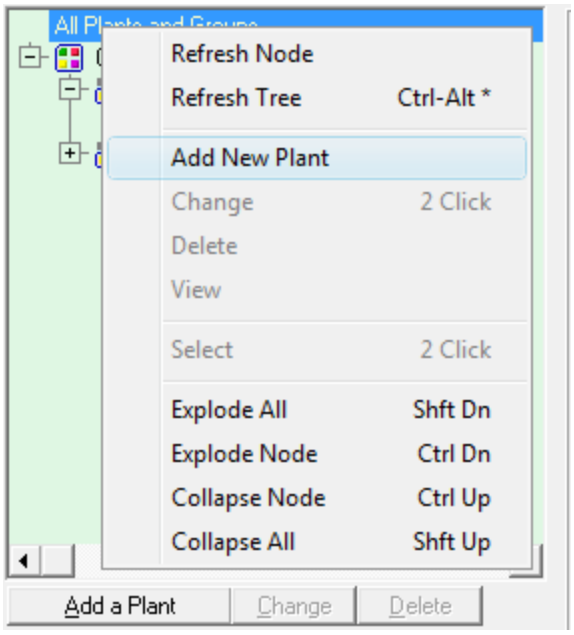
Adding a Plant

Follow the instructions detailed below to add a new plant.

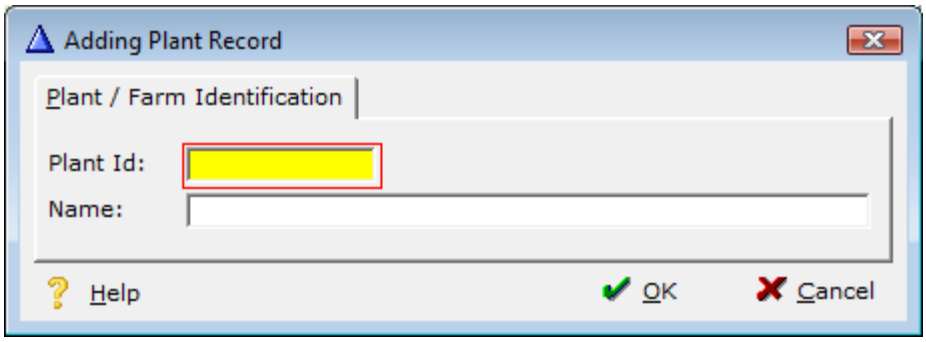
1 In the hierarchy tree panel, click once on All Plants and Groups so it is highlighted, as illustrated below.



2 Click Add a Plant, or the user may right click on All Plants and Groups and select Add New Plant from the menu that is displayed, as illustrated below.



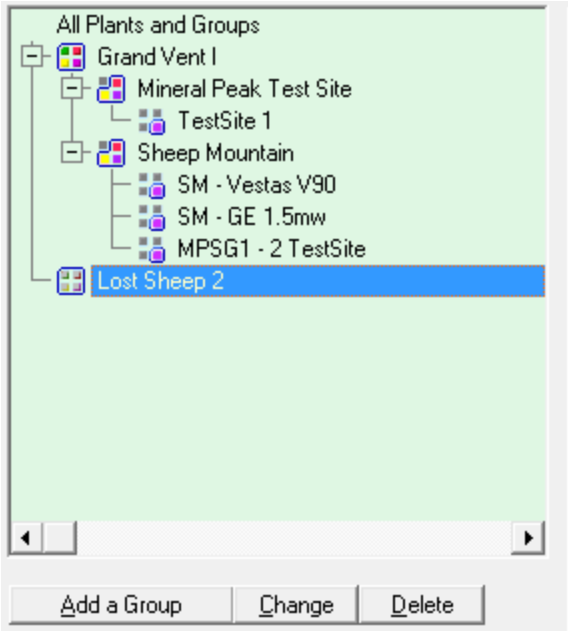
The Adding Plant Record window is displayed, as illustrated below.



3 Enter a unique Plant Id in the Plant Id field.

4 Enter a name in the Name field. This is the field that will be displayed in the hierarchy window.

5 Click **OK**. The new plant is displayed in the group hierarchy, as illustrated below.

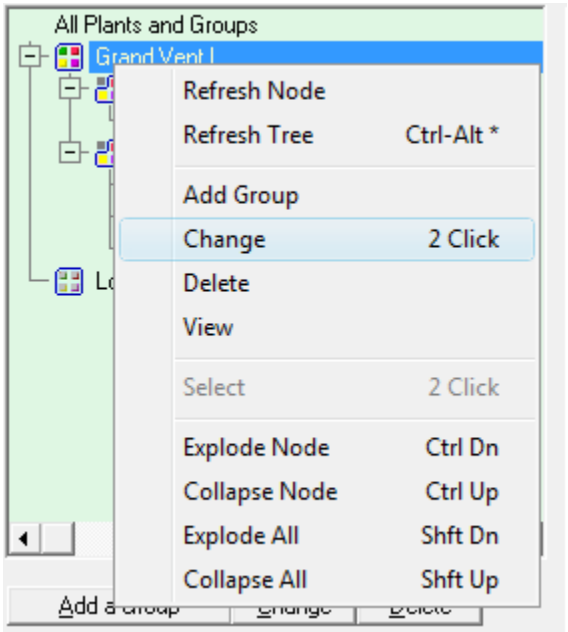


Changing a Plant

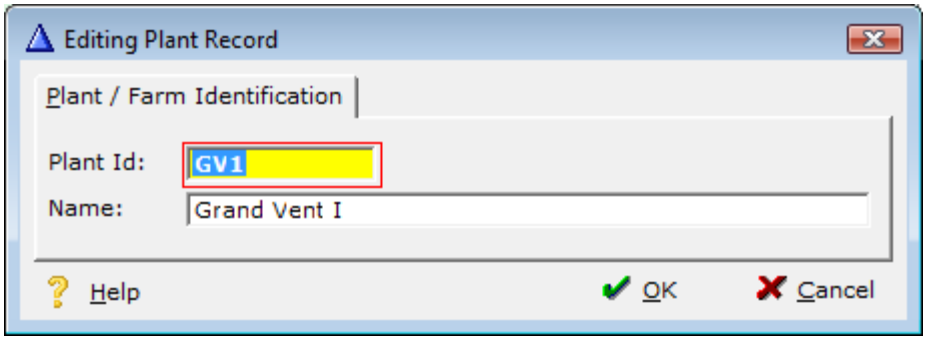
Follow the instructions detailed below to change an existing plant.

1 Click once on the desired plant.

2 Click Change, or the user may right click on the desired plant and select Change from the menu that is displayed, as illustrated below.



The Editing Plant Record window is displayed, as illustrated below.



3 Change the Plant Id in the Plant Id field as desired. This field must be unique as it is used to identify the plant and related groups.

4 Change the name in the Name field as desired.

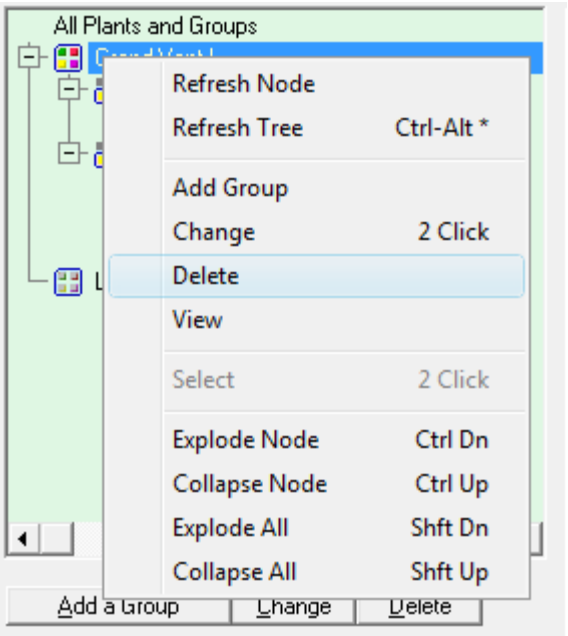
5 Click **OK**. The changed information is saved and the main window is displayed.

Deleting a Plant

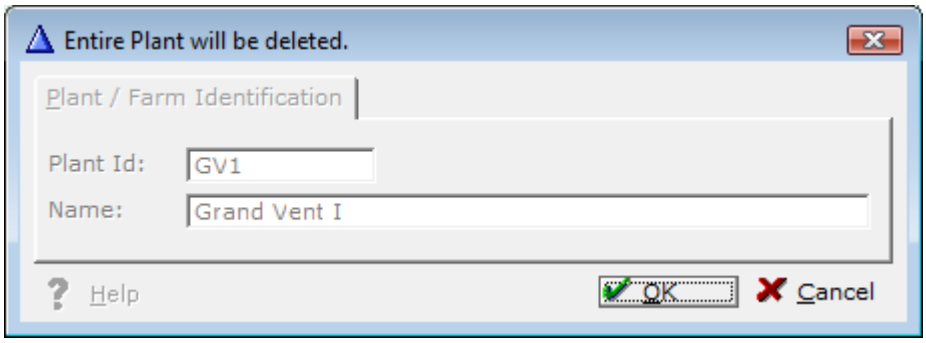
Follow the instructions detailed below to delete an existing plant.

1 Click once on the desired plant.

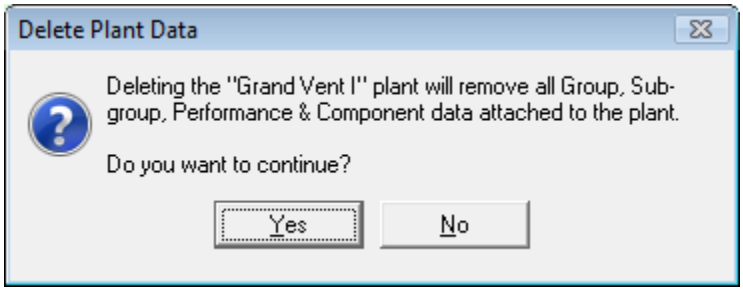
2 Click Delete, or the user may right click on the desired plant and select Delete from the menu that is displayed, as illustrated below.



A confirm delete message is displayed, showing the information that will be deleted, as illustrated below.



3 Click **OK**. An additional confirm delete message is displayed, as illustrated below.



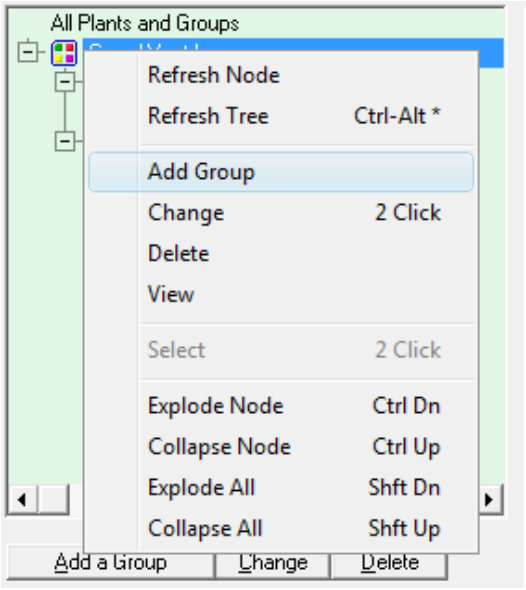
4 Click **Yes** to continue to delete the plant and all group, sub-group, performance and component data attached to the selected plant. The main window is displayed.

Adding a Group

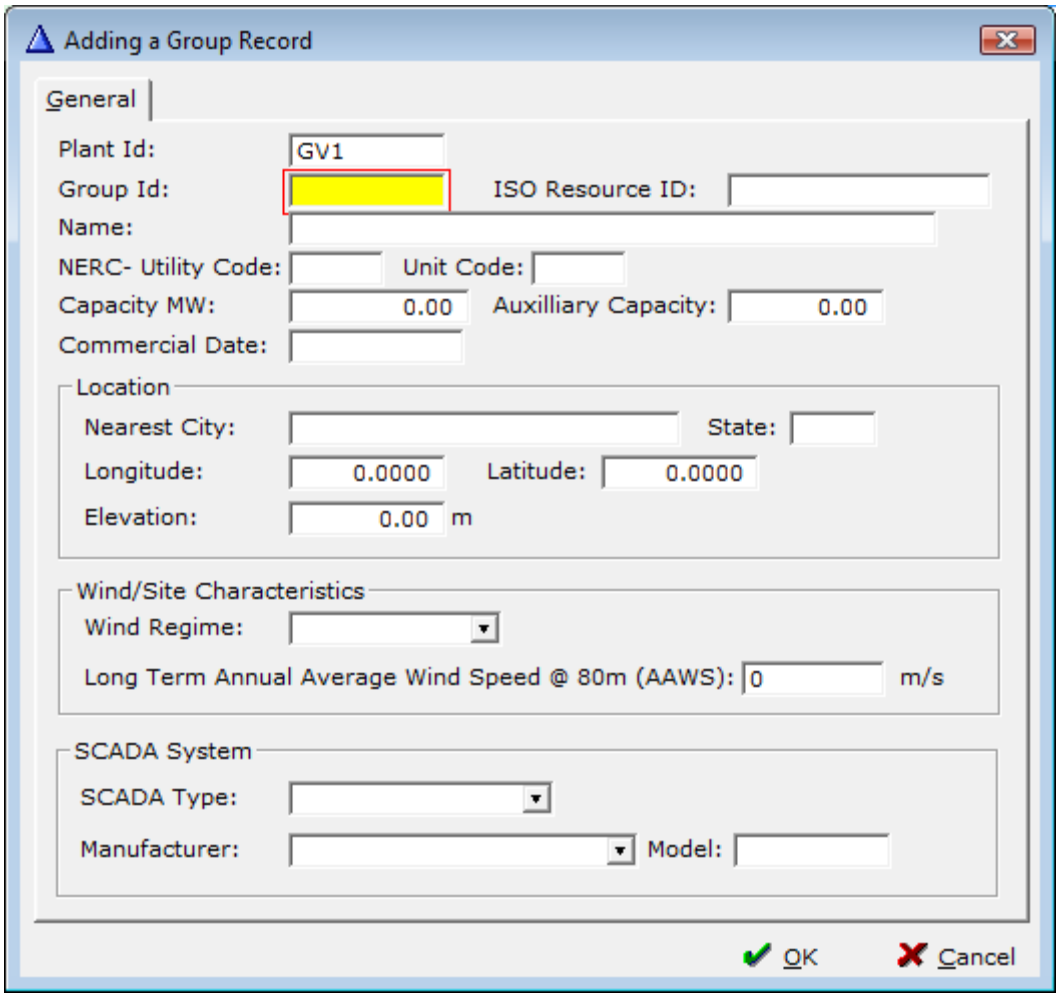
Follow the instructions detailed below to add a new group.

1 Click once on the desired plant to add a group to.

2 Click Add Group or the user may right click on the desired plant and select Add Group from the menu that is displayed, as illustrated below.



The Adding a Group Record window is displayed, as illustrated below.



3 Enter a Group Id in the Group Id field.

4 Enter a display name for the Group in the Name field.

Note: All other fields are optional, but it is recommended that as many fields as possible be filled out to allow for the most accurate peer group comparisons.

5 Fill in any other desired fields. The following table lists and describes all fields.

Field	Description
Plant Id	The unique name given to the plant that the group is being created under.
Group Id	A unique ID given to the group.
ISO Resource ID	A unique identification given to the Group by the ISO.
Name	Individual name given to the group which is displayed in the hierarchy tree.
NERC – Utility Code	This is the 3-character Utility code assigned by NERC.
Unit Code	This is the 3-character Unit code assigned by NERC.
Capacity MW	The total capacity of the group measured in MegaWatts.
Auxiliary Capacity	The total capacity of the auxiliary turbines of the group, measured in MegaWatts.
Commercial Date	Date the group entered into active status.
Nearest City	Name of the city closest in proximity to the group.
State	Name of the state in which the group is located.
Longitude	The longitude of the group's location.
Latitude	The latitude of the group's location.
Elevation	The elevation of the group, measured in Meters.
Wind Regime	The type of area where the group is located. The drop-down menu for this field contains 5 options: Seashore, Plain, Plateau, Hills, and Mountain.
AAWS	The Annual Average Wind Speed, measured in meters per second.
SCADA Type	The type of SCADA being used. The drop-down menu for this field contains 7 options: Analog, Digital, IP, Ethernet, Frame Relay, Private Wire, and 56 Kbps DDS
Manufacturer	The manufacturer name of the SCADA.
Model	The model name of the SCADA.

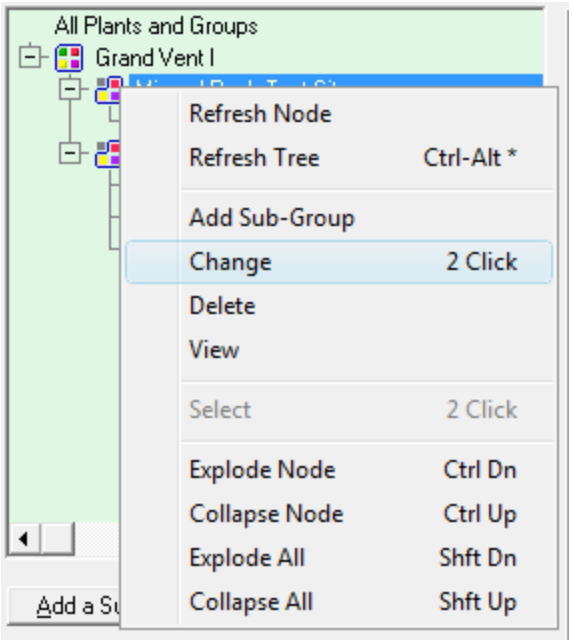
6 Click **OK** after all desired information is entered into the appropriate fields. The main window is displayed with the newly inserted group displayed in the group hierarchy tree.

Changing a Group

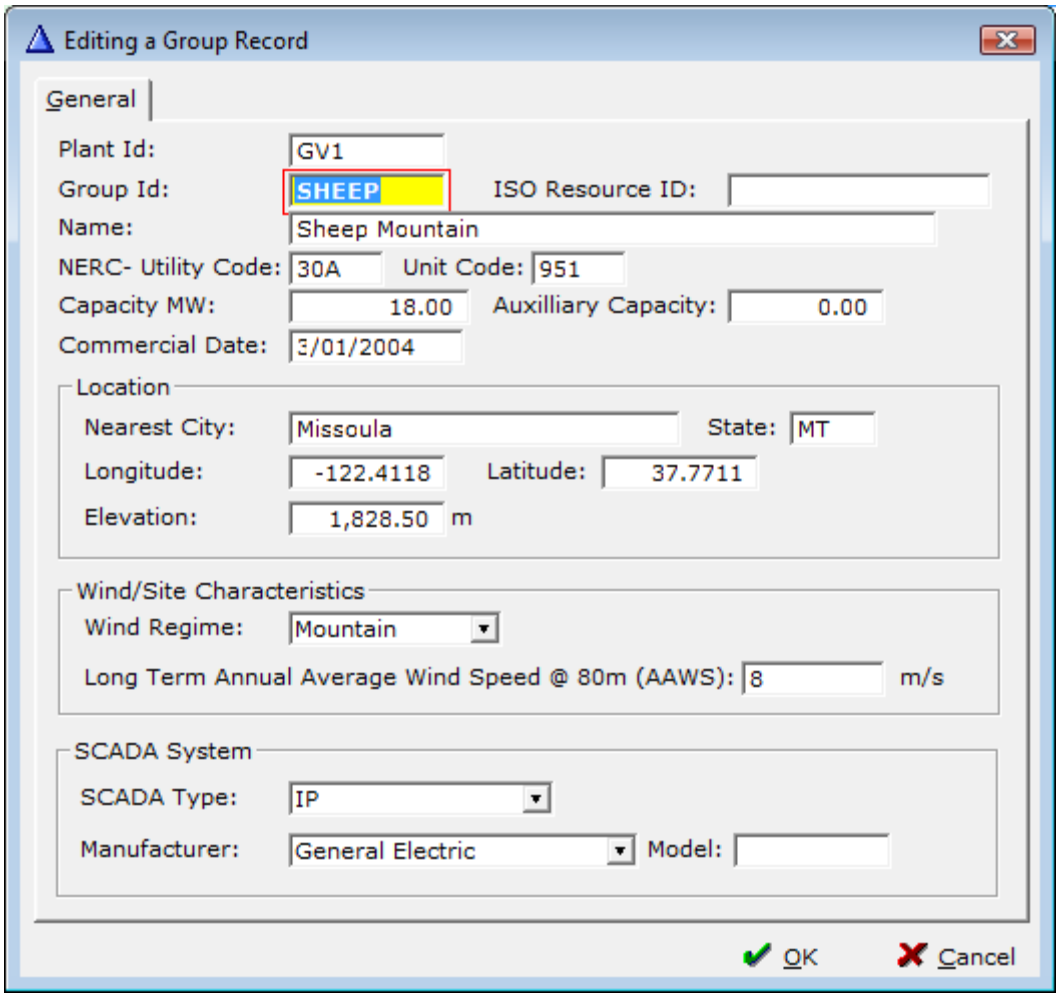
Follow the instructions detailed below to change a group.

1 Click on the desired group.

2 Click Change, or the user may right click on the desired group and select Change from the menu that is displayed, as illustrated below.



The Editing a Group Record window is displayed, as illustrated below.



3 Change any field as needed.

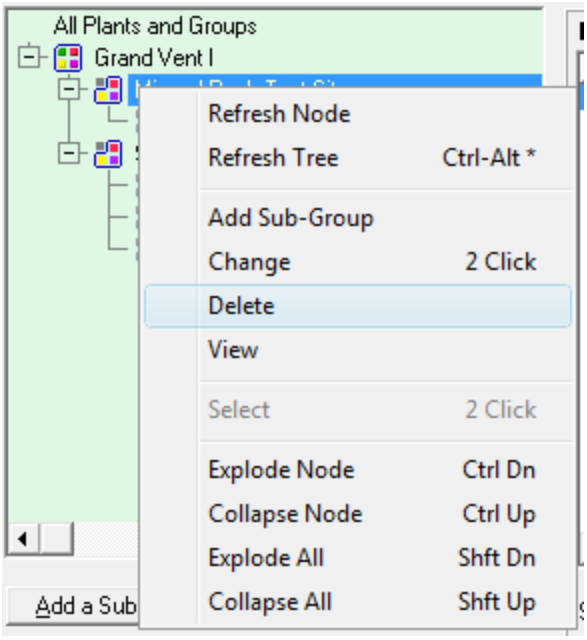
4 Click **OK**. The changed information is saved and the main window is displayed.

Deleting a Group

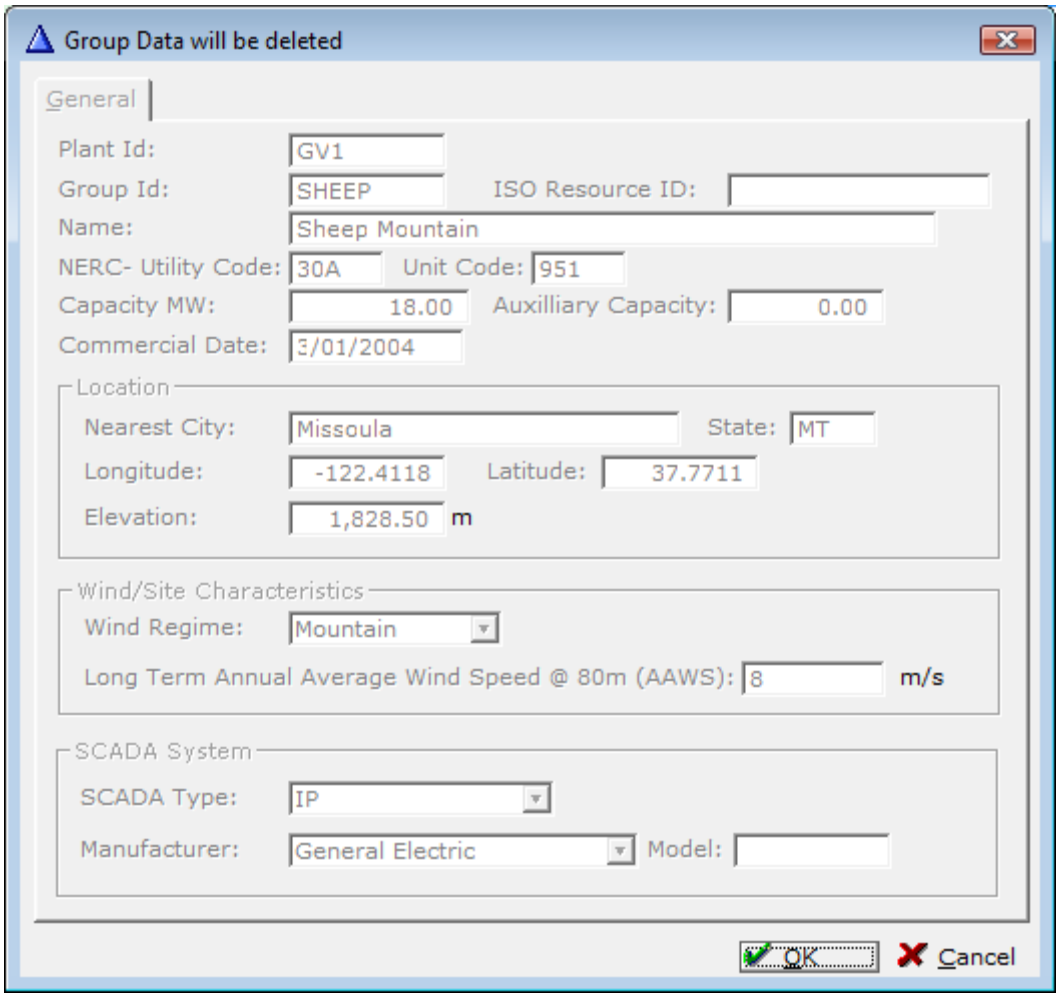
Follow the instructions below to delete a group.

1 Click on the desired group.

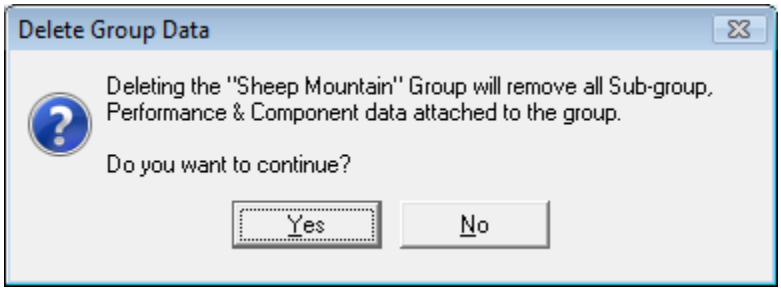
2 Click Delete, or the user may right click on the desired group and select Delete from the displayed menu, as illustrated below.



A confirm delete message is displayed, as illustrated below.



3 Click **OK** to continue. An additional confirm delete message is displayed, as illustrated below.



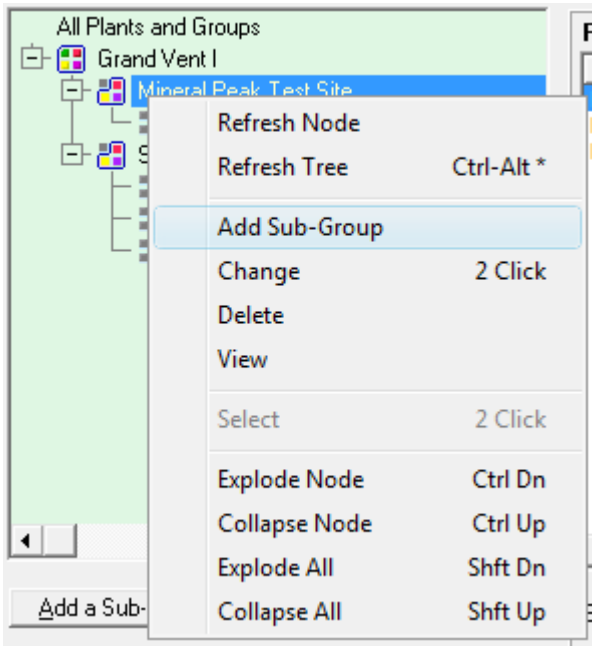
4 Click **Yes** to continue and to delete the group and all sub-group, performance and component data attached to the selected group. The main window is displayed.

Adding a Sub-Group

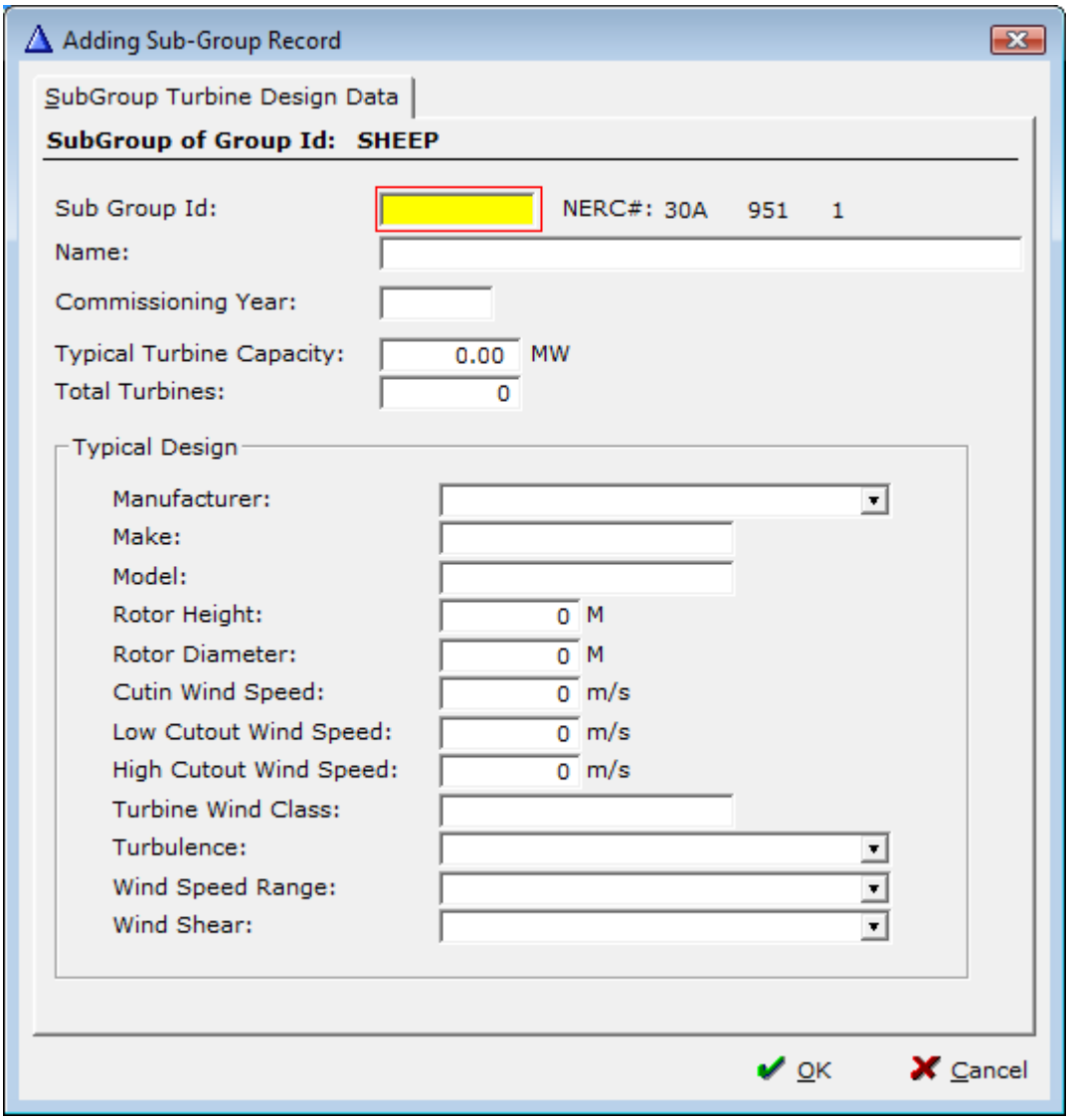
Follow the instructions below to add a new sub-group.

1 Click once on the desired group under which to create the new sub-group.

2 Click Add a Sub-Group, or the user may right click on the desired group and select Add Sub-Group from the displayed menu, as illustrated below.



The Adding Sub-Group Record window is displayed, as illustrated below.



3 Enter the sub-group ID in the Sub Group Id field.

4 Enter the name in the Name field.

5 Fill in the Typical Turbine Capacity field.

6 Fill in the Total Turbines field.

Note: All other fields are optional, but it is recommended that as many fields as possible be filled out to allow for the most accurate peer sub-group comparisons.

7 Fill in any other desired fields. The following table lists and describes all fields.

Field	Description
Sub Group Id	A unique ID of the sub-group.
Name	The name given to the sub-group that is displayed in the group hierarchy tree.
Commissioning Year	The year in which the sub-group entered into an active state.
Typical Turbine Capacity	Typical Turbine Capacity is the MW rating of an individual wind turbine. This value is multiplied by the number of turbines to calculate the total capacity of the sub-group.
Total Turbines	Total number of turbines contained within the sub-group.
Design Capacity Factor	The capacity factor of the turbine as stated by the manufacturer of the turbine.
Manufacturer	The manufacturer of the turbines of the sub-group. The drop-down menu for this field contains 12 options: Denertec S.A.C., Earth Wind And Power LLC, Enercon Gmbh, Green Energy Technologies, Nordex, Prime Wind Power International, R.E. Power Systems Ag, Stock Equipment Co., Urban Green Energy, Vestas, Wind Energy Solutions, and Winwind.
Make	The name of the make of the turbines contained in the sub-group.
Model	The type of model of the turbines contained in the sub-group.
Rotor Height	Height of the rotor in meters.
Rotor Diameter	Diameter of Rotor in meters.
Cut-in Wind Speed	The lowest wind speed that the turbine will start to generate power, in meters per second.
Low Cut-out Wind Speed	The lowest wind speed that the turbine can continue to generate power before cutting out, in meters per second.
High Cut-out Wind Speed	This is the highest wind speed at which the turbine is capable of generating power before cutting out, in meters per second.
Turbine Wind Class	Wind Class is a calculation of Wind Power Density and Wind Speed at a given height above the ground. This number is given in a range of 1-7.

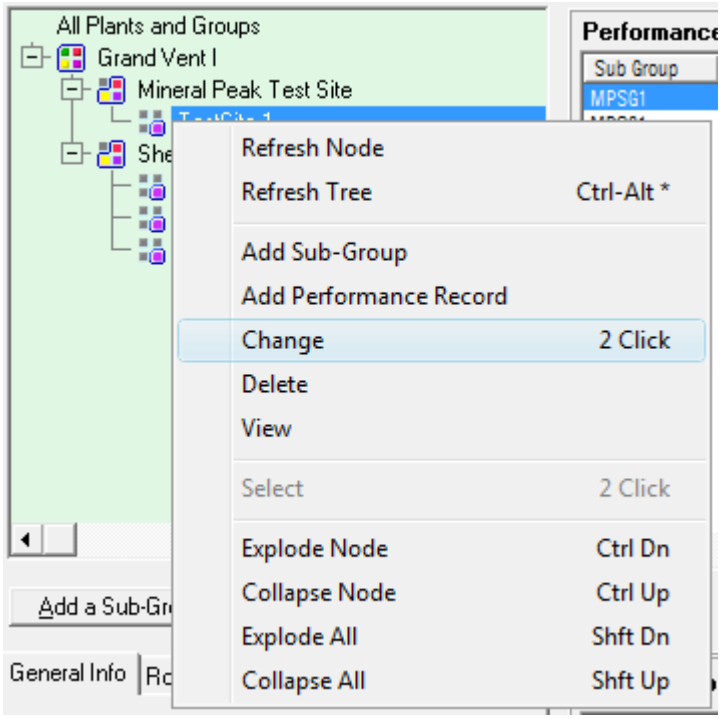
8 Click OK after all desired information is entered into the appropriate fields. The main window is displayed with the newly inserted sub-group displayed in the group hierarchy tree.

Changing a Sub-Group

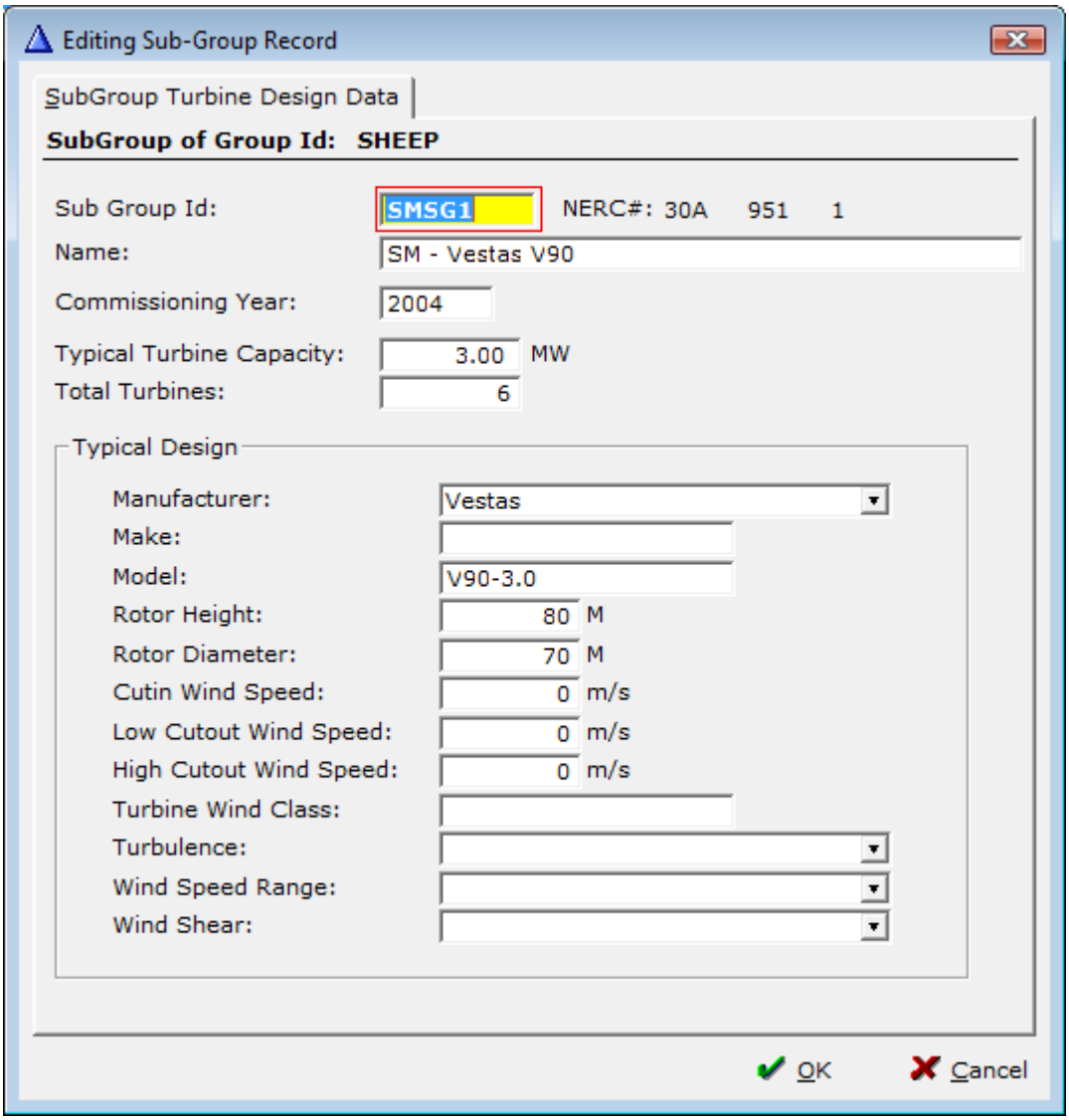
Follow the instructions detailed below to change an existing sub-group.

1 Click once on the desired sub-group to change.

2 Click Change, or the user may right click on the desired sub-group and select Change from the displayed menu, as illustrated below.



The Editing Sub-Group Record window is displayed, as illustrated below.



3 Change any field as needed.

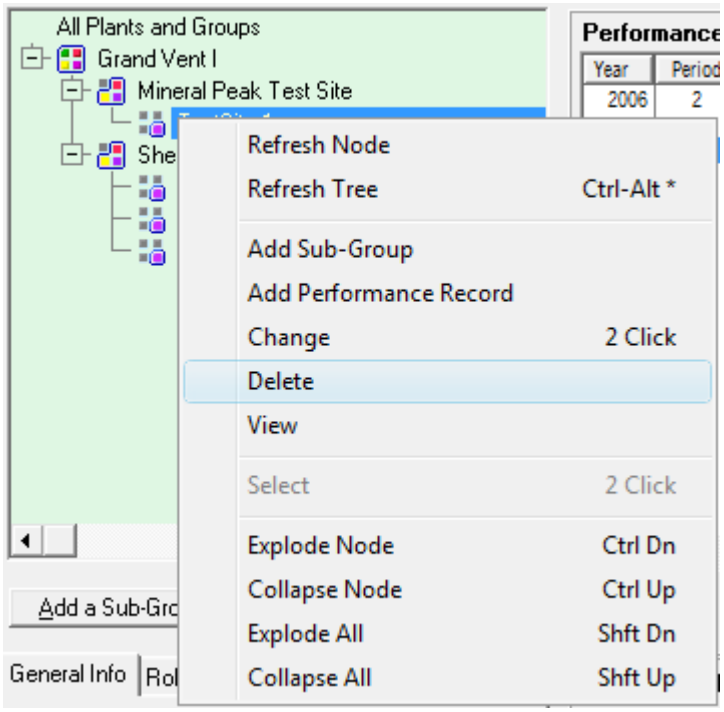
4 Click **OK**. The changes are saved and the main window is displayed.

Deleting a Sub-Group

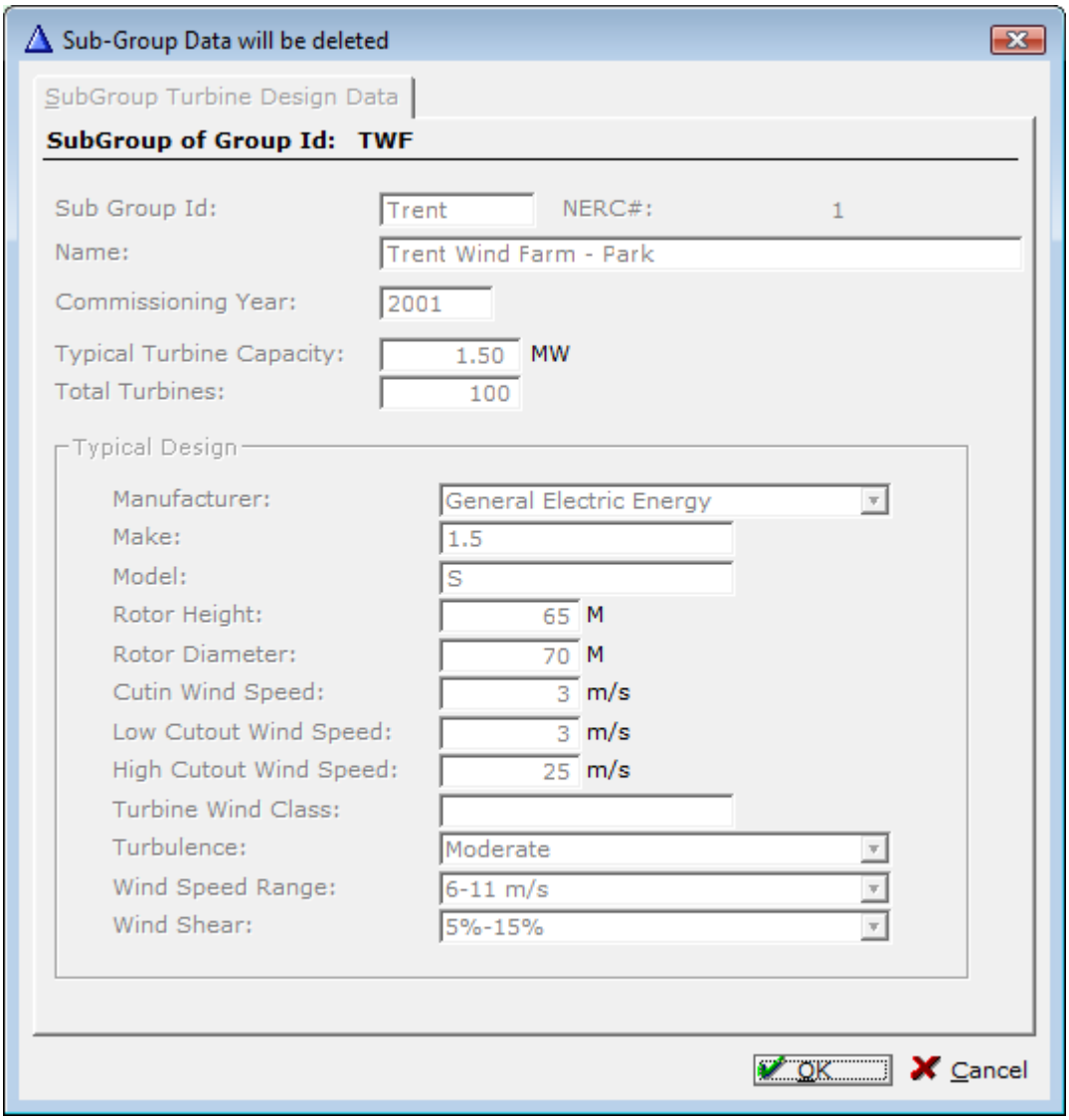
Follow the instructions detailed below to delete a sub-group.

1 Click once on the desired sub-group to delete.

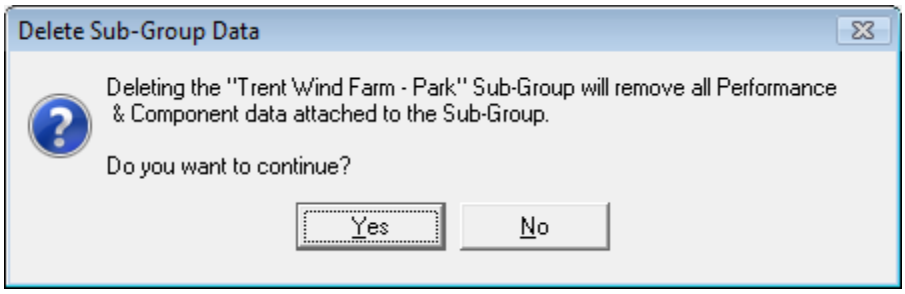
2 Click **Delete**, or the user may right click on the desired sub-group and select Delete from the displayed menu, as illustrated below.



A confirm delete message is displayed, as illustrated below.



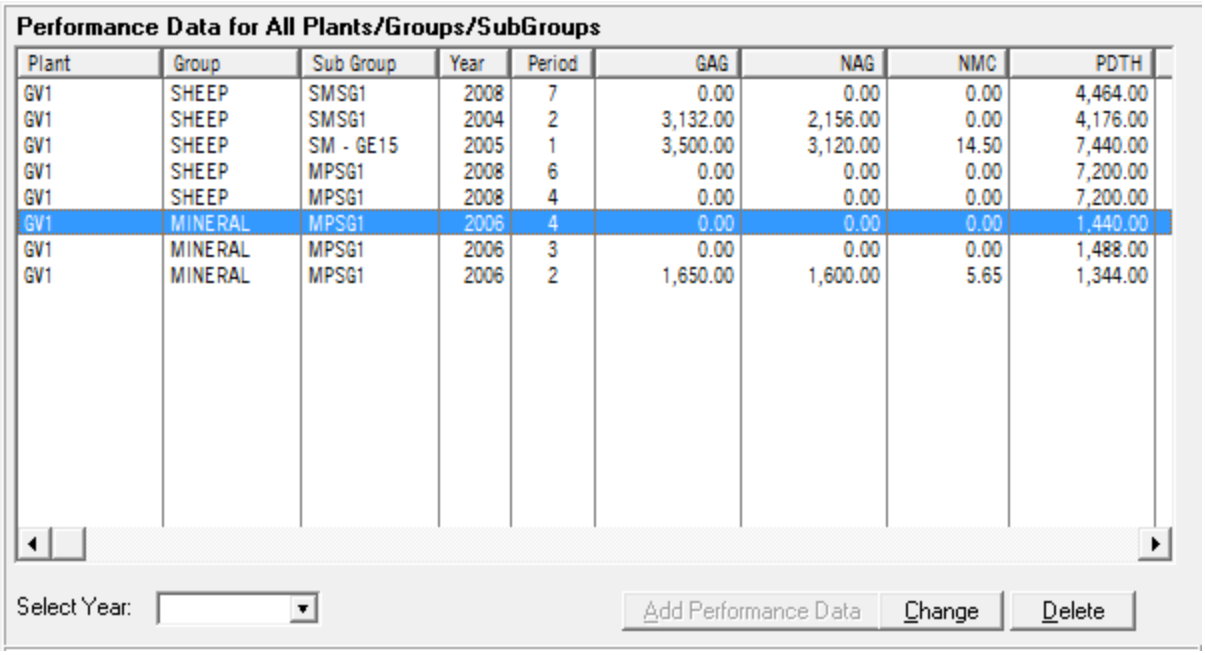
3 Click **OK** to continue. An additional confirm delete message is displayed, as illustrated below.



Click **Yes** to continue to delete the sub-group and all performance and component data attached to the selected sub-group. The main window is displayed.

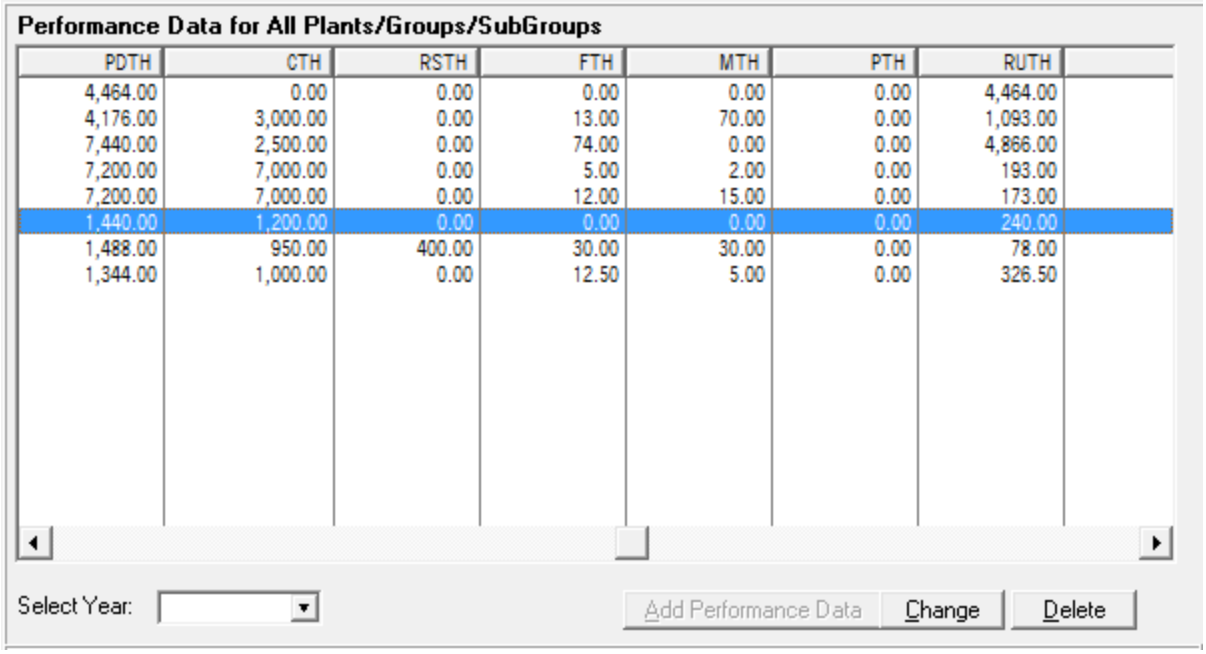
Section 5 – Performance Data

The performance data for a selected plant, group, or sub-group is listed in the panel at the top right of the main window, as illustrated below.



Performance data is listed chronologically by year and period within each group. In this example, the performance data for all Plants and Groups is shown.

To view additional data, use the scroll bar on the bottom to scroll to the right. The additional data columns are shown as illustrated below.



The Select Year drop down allows the user to choose a specific year to view records from.

The following table lists and describes each of the data found in the performance data panel.

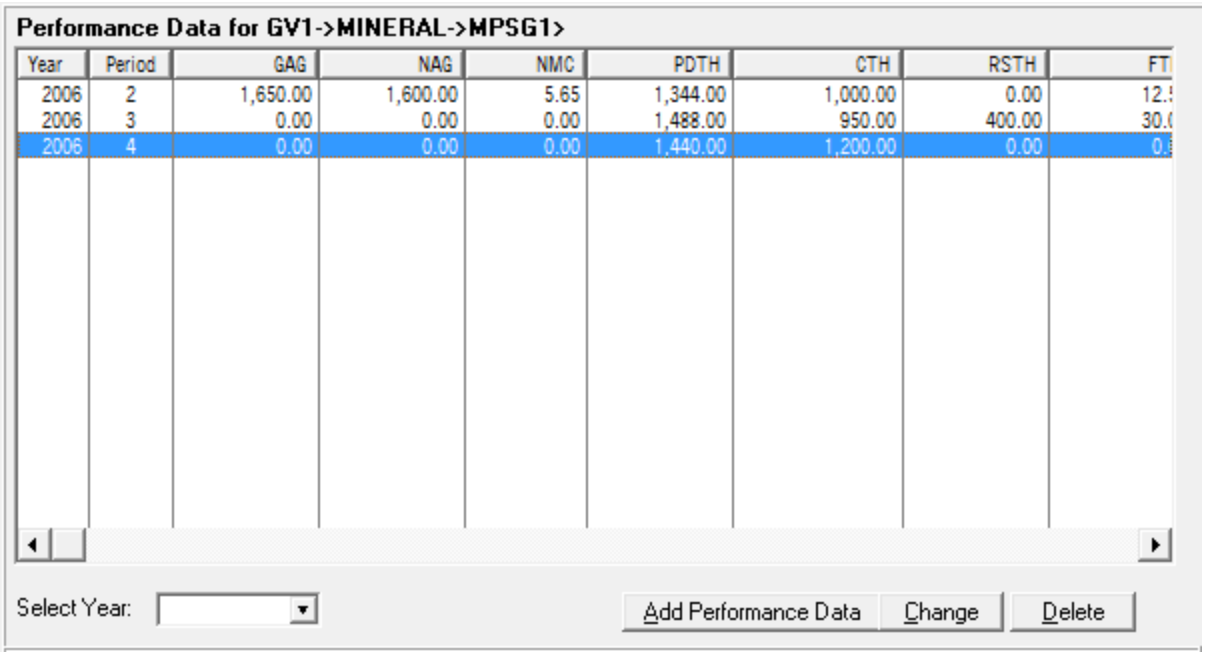
Column	Description
GAG	The Gross Actual Generation is the total wind turbine energy going out of the Wind Turbine Group (MWh). GAG is the sum of all individual turbine meters before removing station service or auxiliary loads.
NAG	Net Actual Generation is the net generation (MWh) recorded at the revenue meter. It is possible to have a negative NAG value if the group's station service or auxiliary loads are greater than total generation.
NMC	Net Maximum Capacity is the actual generation capability at the revenue meter and is equal to the installed capacity less any electrical losses such as transformation losses, line losses, and other auxiliary losses due to transmission between the turbine and revenue meter.
PDTH	Period Turbine-Hours is the number of turbine-hours being reported that the sub-group is in the active state. PDTH can vary in output reports (month, year, etc.) but for GADS reporting purposes, data is collected on the number of turbine-hours in a month.
CTH	Contactor Turbine-Hours is the number of turbine-hours the sub-group is synchronized to the system. It is the turbine-hours that the contactors are closed and generation is provided to the grid.
RSTH	Reserve Shutdown Turbine-Hours is the sum of all turbine-hours that the sub-group is available to the system at a reduced capacity for economic reasons. There are no equipment problems and the turbines are ready for service. Do not include RSTH with the same equations with CTH (double counting TH).
FTH	Forced Turbine-Hours is the sum of all turbine-hours the sub-group is off-line due to forced events. FTH are all forced events where the WTG must be removed from service for repairs before the next Sunday at 24:00 (just before Sunday becomes Monday).
MTH	Maintenance Turbine-Hours is the sum of all turbine-hours the sub-group is off-line due to a Maintenance event.
PTH	Planned Turbine-Hours is the sum of all turbine-hours the sub-group is off-line due to a Planned event. A PTH event is scheduled well in advance and is of a predetermined duration and can occur several times a year.
RUTH	Resource Unavailable Turbine-Hours is the number of turbine-hours the sub-group is not producing electricity due to the wind being too low or too high or was outside the manufacturer's operating specifications.

Adding Performance Data

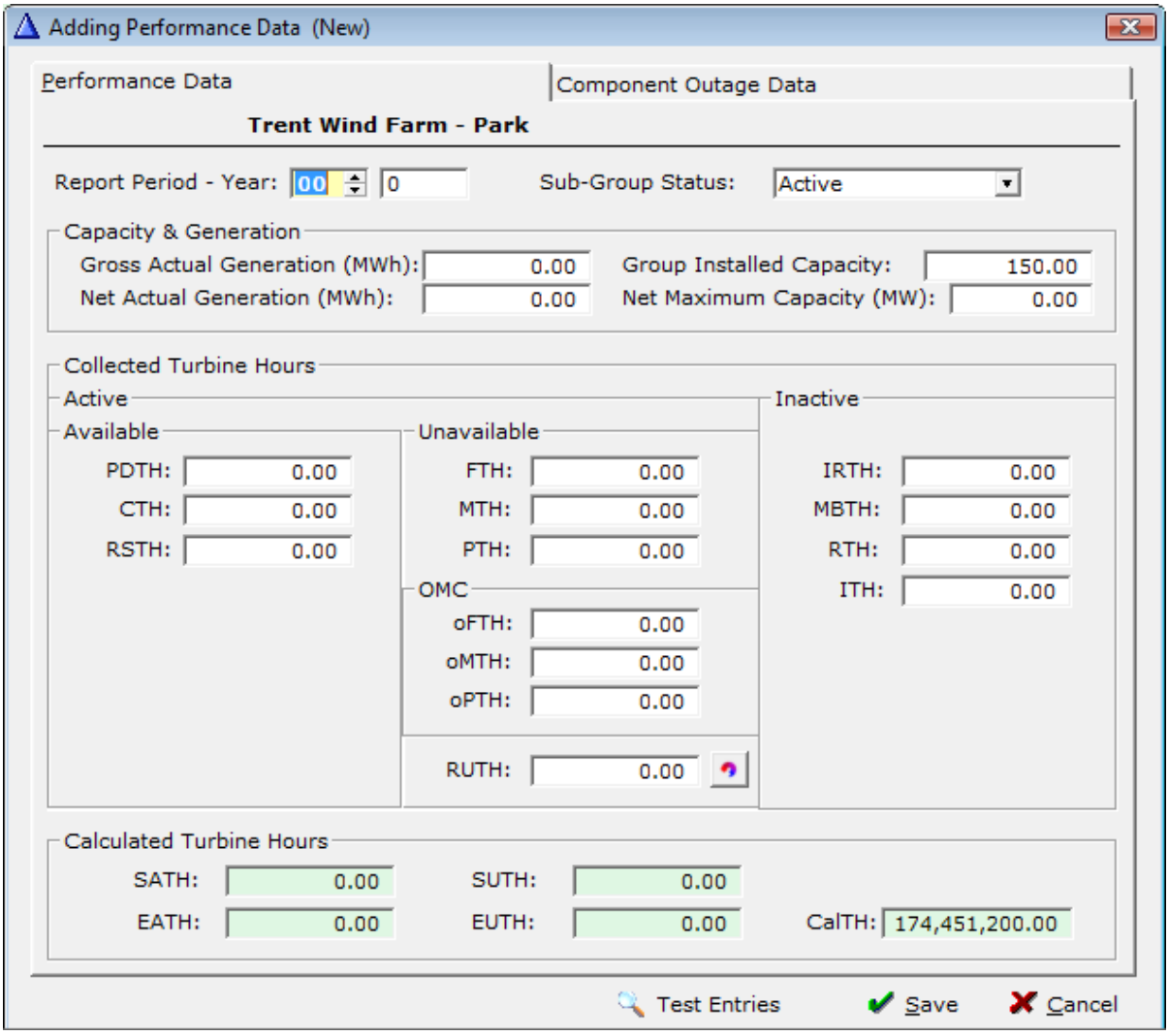
Follow the steps detailed below to add new performance data.

Note: Performance Data can only be added to an existing Sub-Group. An existing sub-group must be selected before any performance data can be added to the record.

1 Select a sub-group from the group hierarchy tree. The performance data for all the periods for that sub-group is displayed in the Performance Data panel. The following example shows the periods for the MPSG1 sub-group.



2 Click Add Performance Data. The Adding Performance Data (New) window is displayed, as illustrated below.



3 In the Report Period – Year field, enter the period and the year that the data is being entered for.

4 From the Sub-Group Status dropdown, select a status. The following table lists and describes the four types of status.

Status	Description
Active	Active State is the time from when the Group is first declared commercially active until it moves to the Inactive State.
Inactive Reserve	IR is defined by IEEE 762 and GADS as "the State in which a group is unavailable for service but can be brought back into service after some repairs in a relatively short duration of time, typically measured in days."
Mothballed	MB is defined by IEEE 762 and GADS as "The State in which a group or individual WTG is unavailable for service but can be brought back into service after some repairs with appropriate amount of notification, typically weeks or months."
Retired Unit	RU is defined by IEEE 762 and GADS as "the State in which a group or individual WTG is unavailable for service and not expected to return to service in the future."

5 The Capacity & Generation heading contains four fields of information. Enter data in these fields accordingly. The following table lists and describes each of the fields.

Field	Description
Gross Actual Generation (MWh)	GAG is the total wind turbine energy going out of the Wind Turbine Group (MWh). GAG is the sum of all individual turbine meters before removing station service or auxiliary loads.
Net Actual Generation (MWh)	NAG is the net generation (MWh) recorded at the revenue meter. It is possible to have a negative NAG value if the group's station service or auxiliary loads are greater than total generation.
Gross Installed Capacity	GIC is the sum of all wind turbines system nameplate rating capability within the Group.
Net Maximum Capacity (MW)	NMC is the actual generating capability at the revenue meter and is equal to the installed capacity less any electrical losses such as transformation losses, line losses, and other auxiliary losses due to transmission between the turbine and the revenue meter.

6 The collected turbine-hours fields are split into two headings, active and inactive. In addition to these two group headings, there are also three other sub-groups that fall under the Active category.

- Under the Available and Unavailable sub-headings, enter data in the appropriate fields. The descriptions of these fields can be found in ***Error! Reference source not found.*** Beginning on page **Error! Bookmark not defined.**.

  When there are no current outage data records, as shown in the first previous example, the FTH, MTH, and PTH fields may be entered without specifying the reason for the outages. Once an outage data record is inserted, all other outage turbine-hours must be specified to avoid the double-counting of outage turbine-hours.

- Under the OMC sub-heading, enter data in the appropriate fields.

  The following table lists and describes each of the fields under the OMC sub-heading.

Field	Description
oFTH	OMC Forced Turbine-Hours is a subset of FTH that equals any forced turbine that were due to causes deemed to be outside of management control (OMC).
oMTH	OMC Maintenance Turbine-Hours is a sub-set of MTH that equals any maintenance turbine-hours that were due to causes deemed to be outside of management control (OMC).
oPTH	OMC Planned Turbine-Hours is a sub-set of PTH that equals any planned turbinehours that were due to causes deemed to be outside of management control (OMC).

- Under Inactive sub-heading, enter data in the appropriate fields.

  The following table lists and describes each of the fields under the Inactive sub-heading.

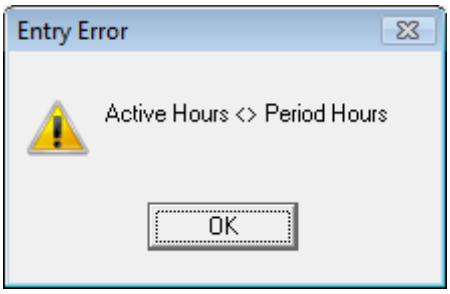
Field	Description
IRTH	Inactive Reserve Turbine-Hours is the total number of turbine-hours in a period being reported that units within the sub-group have been in the inactive reserve status.
MBTH	Mothballed Turbine-Hours is the total number of turbine-hours in a period being reported that units within the sub-group have been in the mothballed status.
RTH	Retired Turbine-Hours is the total number of turbine-hours in a period being reported that units within the sub-group have been in the retired status.
ITH	Inactive Turbine-Hours is the total number of turbine-hours in a period being reported that units within the sub-group are in the inactive state.

7 The calculated turbine-hours heading contains five fields. These fields are automatically calculated using the data entered in the previous fields. The table below lists and describes the fields under the calculated turbine-hours heading.

Field	Description
SATH	Site Available Turbine-Hours is the Period Turbine-Hours (PDTH) minus the Resource Unavailable Turbine-Hours (RUTH).
EATH	Equipment Available Turbine-Hours is the sum of the Contact Turbine-Hours (CTH) and Resource Unavailable Turbine-Hours (RUTH).
SUTH	Site Unavailable Turbine-Hours is the sum of Planned Turbine-Hours (PTH), Forced Turbine-Hours (FTH), Maintenance Turbine-Hours (MTH), and Resource Unavailable Turbine-Hours (RUTH).
EUTH	Equipment Unavailable Turbine-Hours is the sum of Planned Turbine-Hours (PTH), Forced Turbine-Hours (FTH), and Maintenance Turbine-Hours (MTH).
CalTH	Calendar Turbine-Hours is equal to the sum of Period Turbine-Hours (PDTH) and Inactive Turbine-Hours (ITH).

8 Once all data is entered, click Test Entries. If all data is balanced, the Good Data message is displayed, as illustrated below.

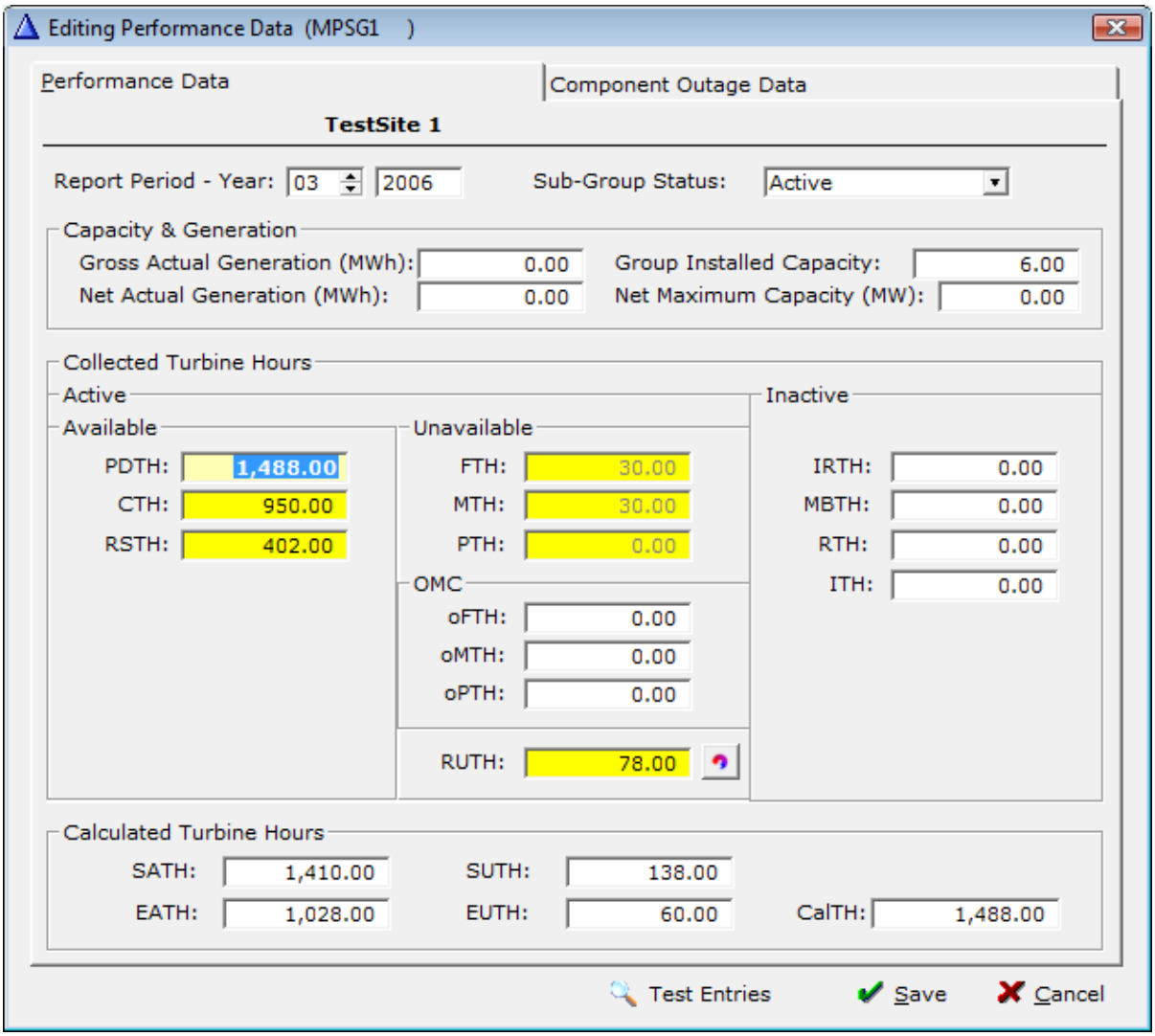
If the data is not balanced, the Entry Error message is displayed, as illustrated below.



The Entry Error message will list what needs to be changed in order for the data to be balanced. In the above example, the Active Hours do not equal the Period Hours.

9 Click **OK**. The Adding Performance Data window is displayed.

10 Correct any errors. Any field that contains an error will be shown in dark yellow, as illustrated below.



Note: Keep the following formulas in mind when entering and balancing data.

CalTH = PDTH + ITH

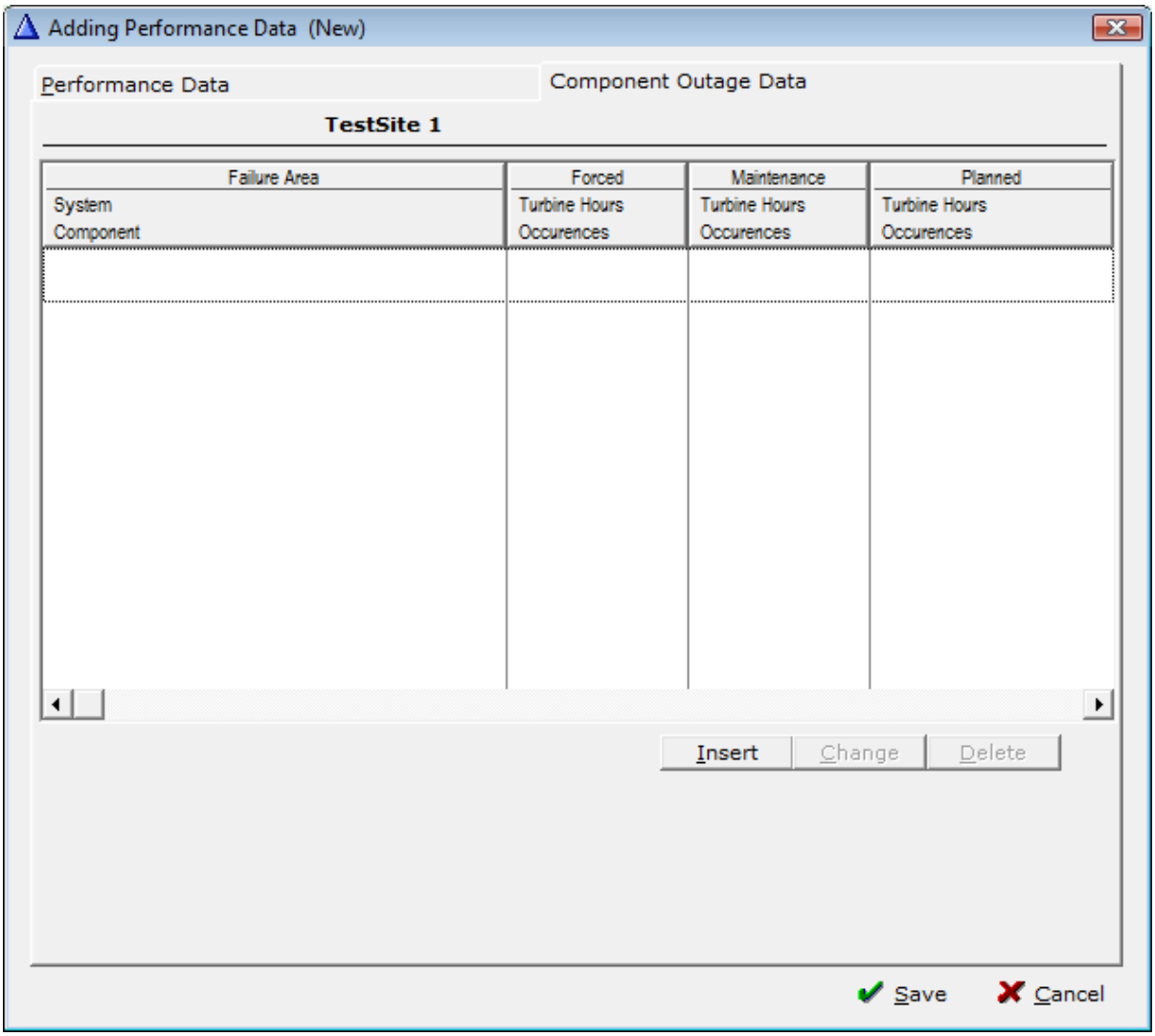
PDTH = CTH + RSTH + FTH + MTH + PTH + RUTH

ITH = IRTH + MBTH + RTH

RUTH = PDTH – (CTH + RSTH + FTH + MTH + PTH)

11 At any time while entering data, the user may click the refresh button to the right of the RUTH field. This will recalculate the RUTH as the remainder of turbine-hours not included in the sum of CTH, RSTH, FTH, MTH, and PTH to equal PDTH.

12 Click on the Component Outage Data tab at the top of the window. The tab is displayed as illustrated below.



13 Click Insert to add new component outage data. The Adding Cause-Outage Data window is displayed.

14 Follow steps 4-11 from *Adding Component Data* starting on page 55 to enter new component data.

15 Click on the Performance Data tab. Once all errors are corrected, click Save. The new record is displayed in the Performance Data panel.

Note: A new Performance Data record cannot be saved when there are errors present. The user must correct all errors before a new record can be saved.

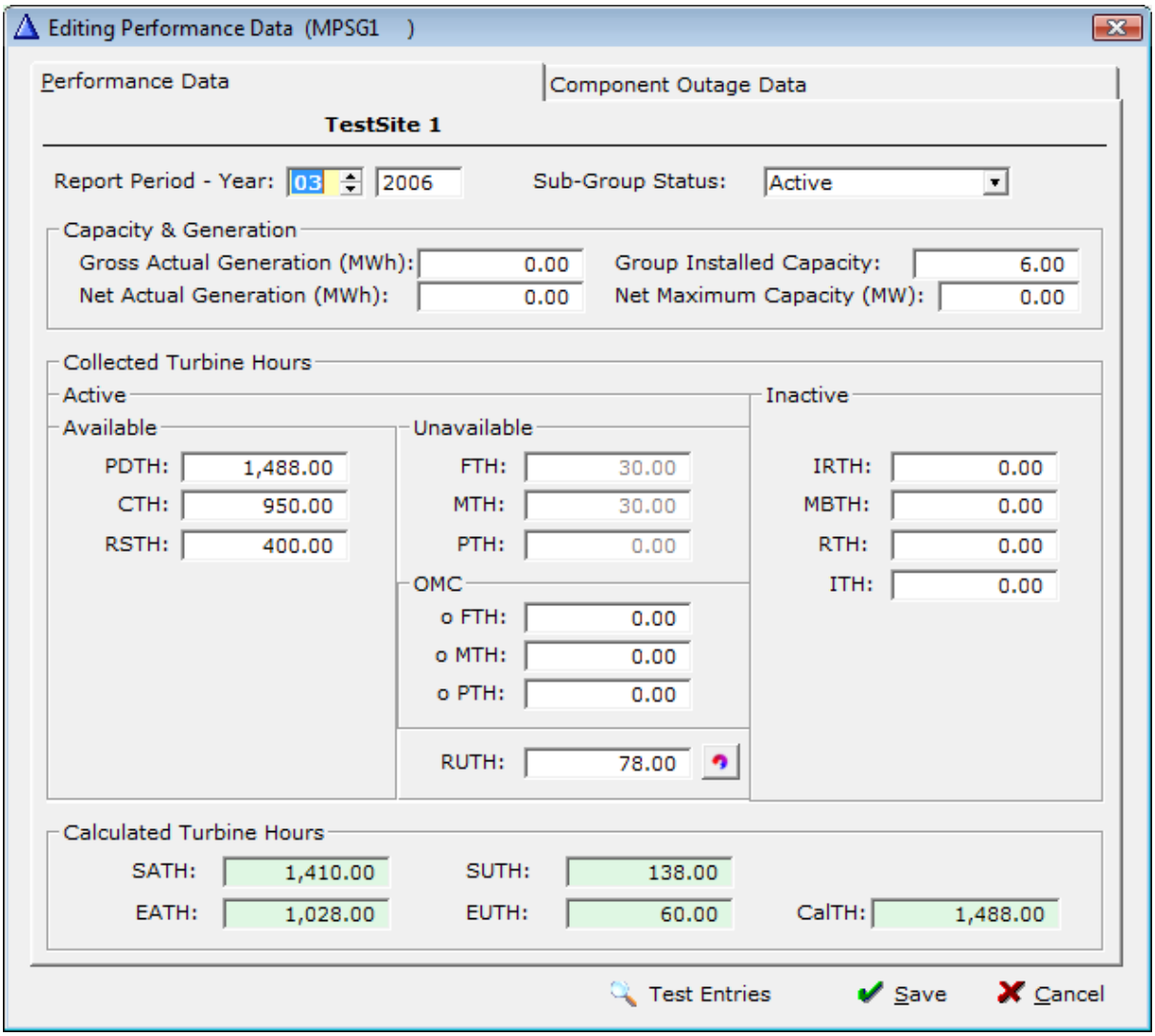
Changing Performance Data

Follow the instructions detailed below to change an existing performance data file.

1 From the group hierarchy tree, select a plant, group, or sub-group.

2 From the Performance Data panel, click to select the desired record.

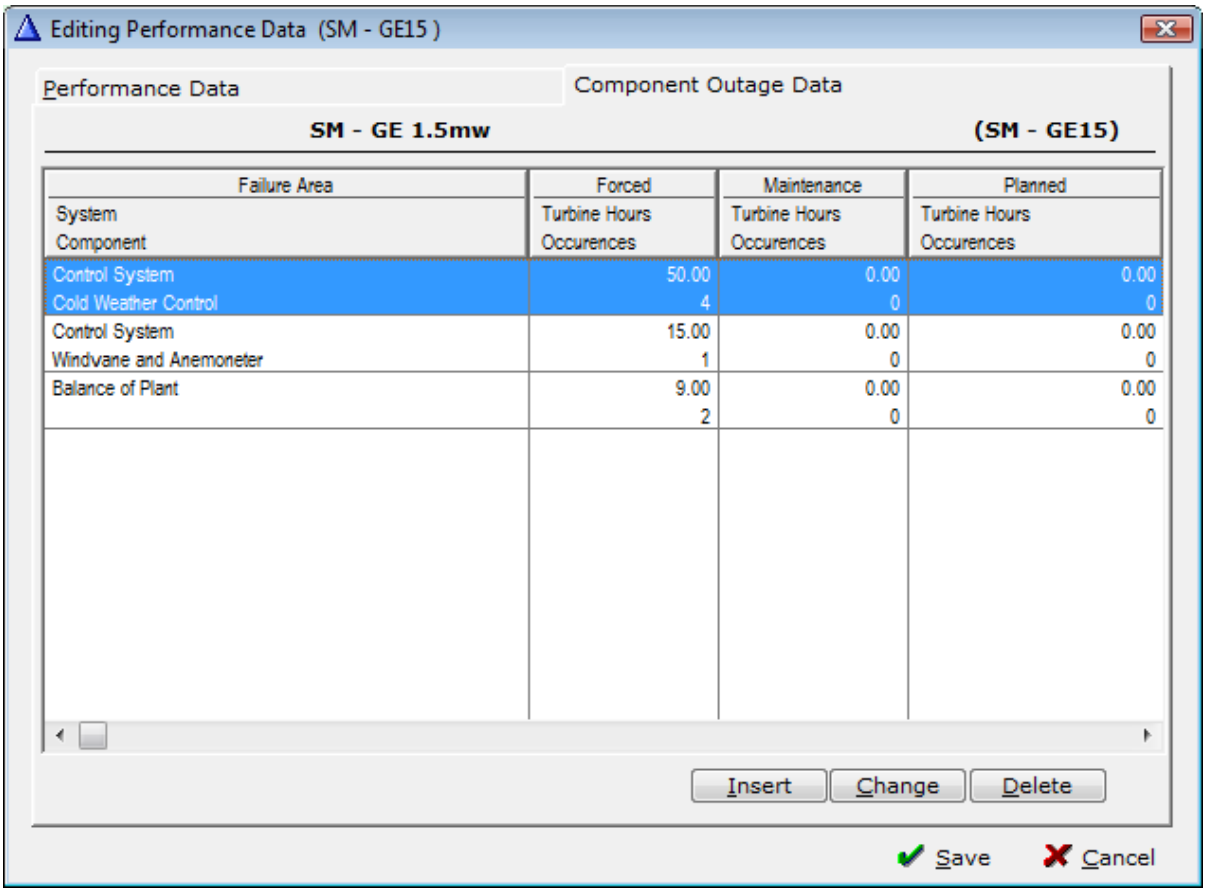
3 Click Change, or double click on the desired record. The Editing Performance Data window is displayed, as illustrated below.



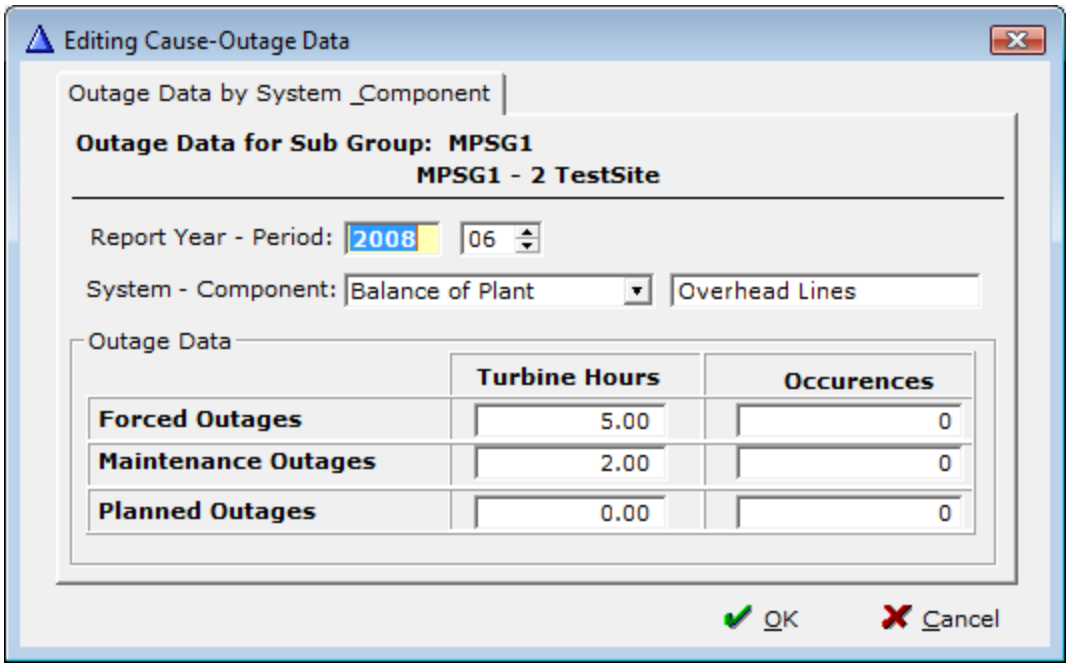
4 Change desired fields.

Note: When there are no current outage data records, the FTH, MTH, and PTH fields may be entered without specifying the reason for the outages. Once an outage data record is inserted, as in the above example, all other outage turbine-hours must be specified to avoid the double-counting of outage turbine-hours.

5 Click the Component Outage Data tab. The tab is displayed as illustrated below.



6 Select the desired outage record to change, then click Change. The user may also double click on the desired record. The Editing Cause-Outage Data window is displayed, as illustrated below.



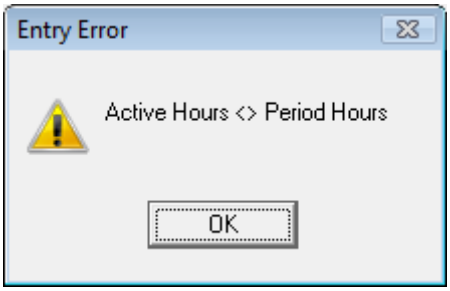
7 Edit fields as necessary.

8 Click **OK**. The Editing Performance Data window is displayed with the Component Outage Data tab selected.

9 Click the Performance Data tab.

10 Once all data is entered, click Test Entries. If all data is balanced, the Good Data message is displayed, as illustrated below.

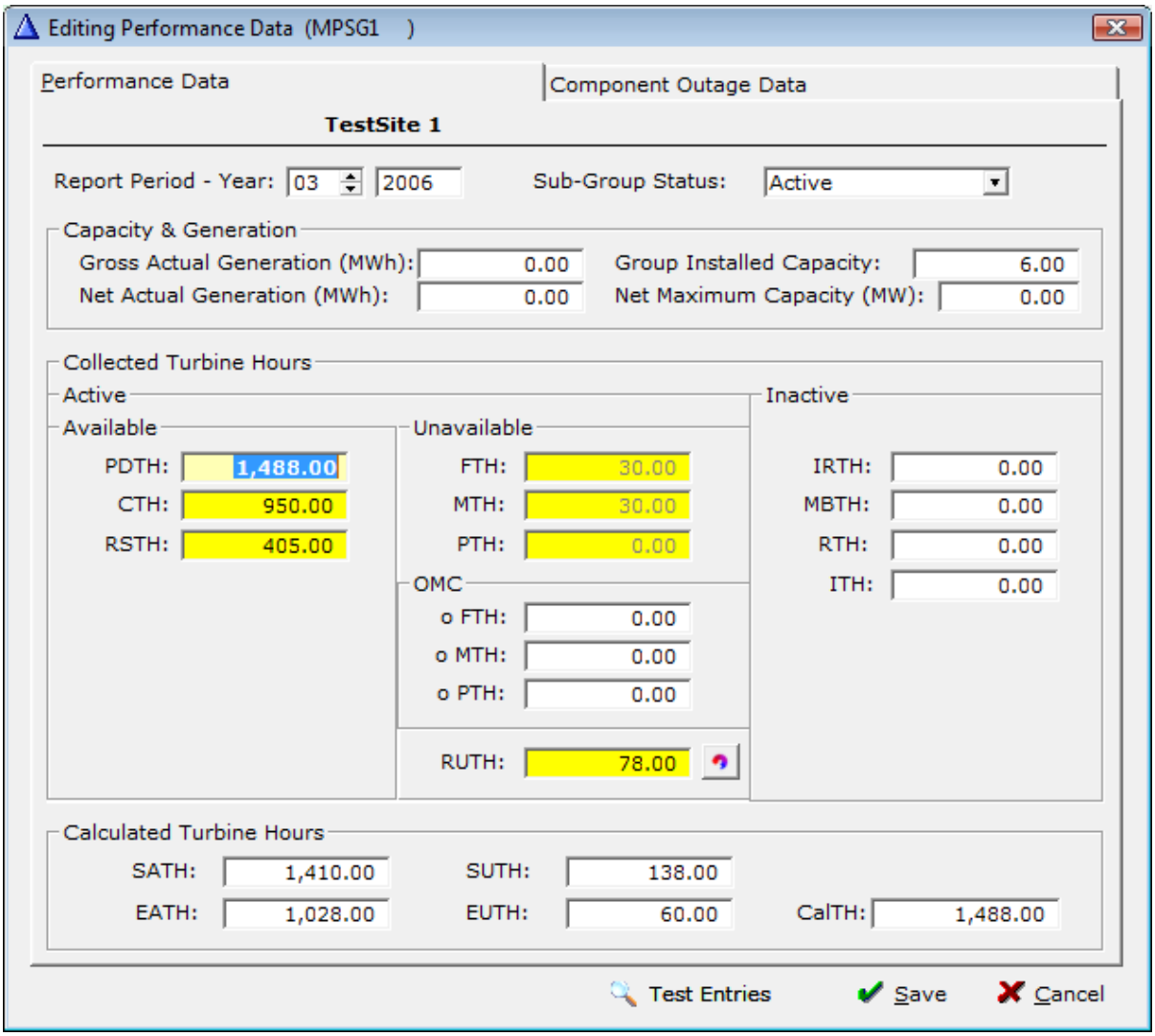
If the data is not balanced, the Entry Error message is displayed, as illustrated below.



The Entry Error message will list what needs to be changed in order for the data to be balanced. In the above example, the Active Hours do not equal the Period Hours.

11 Click **OK**. The Editing Performance Data window is displayed.

12 Correct any errors. Any field that contains an error will be shown in dark yellow, as illustrated below.



Note: Keep the following formulas in mind when balancing data.

CalTH = PDTH + ITH

PDTH = CTH + RSTH + FTH + MTH + PTH + RUTH

ITH = IRTH + MBTH + RTH

RUTH = PDTH – (CTH + RSTH + FTH + MTH + PTH)

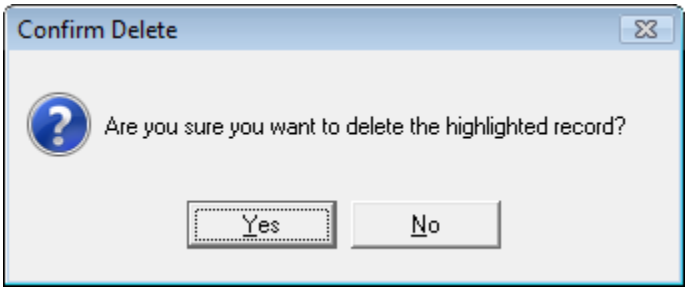
13 At any time while entering data, the user may click the refresh button to the right of the RUTH field. This will recalculate the RUTH as the remainder of turbine-hours not included in the sum of CTH, RSTH, FTH, MTH, and PTH to equal PDTH.

14 Once the errors are corrected, click Save. The edited entry is displayed in the Performance Data panel.

Deleting Performance Data

Follow the instructions detailed below to delete performance data.

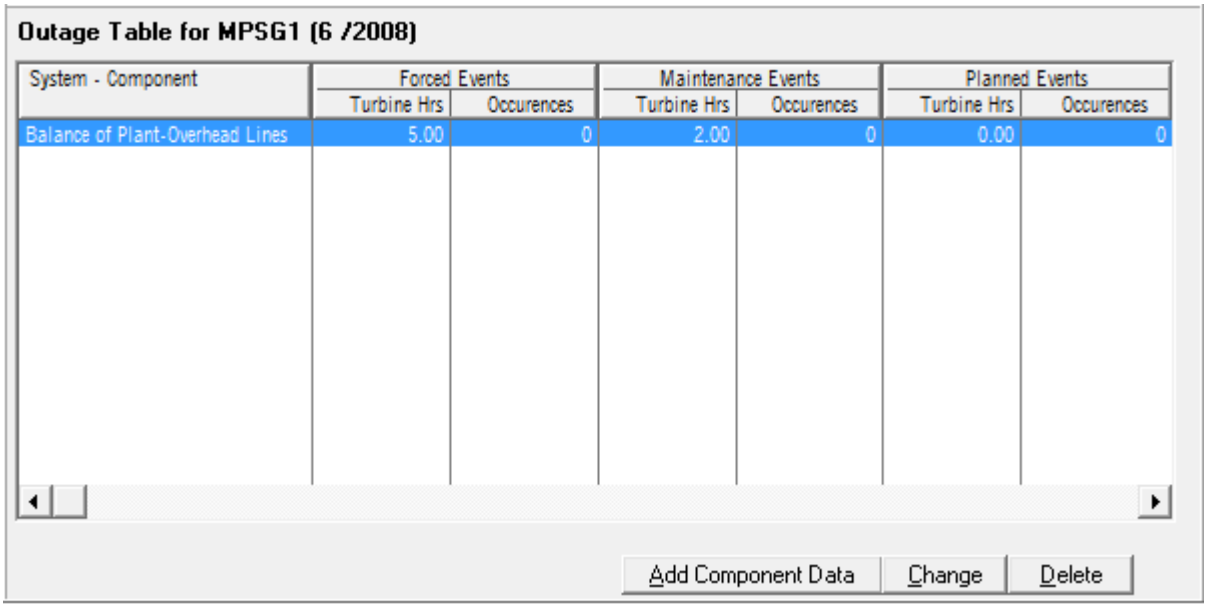
1. From the group hierarchy tree, select a plant, group, or sub-group.
2. From the Performance Data panel, click to select the desired performance data record.
3. Click **Delete**. The Confirm Delete window is displayed, as illustrated below.



4. Click **Yes** to delete the selected record. The selected record is deleted. The main window is displayed.

Section 6 – Outage Event

The outage event data for a selected performance data record is listed in the panel at the bottom right of the main window, as illustrated below.



The above example shows the outages for the selected period in the MPSG1 sub-group.

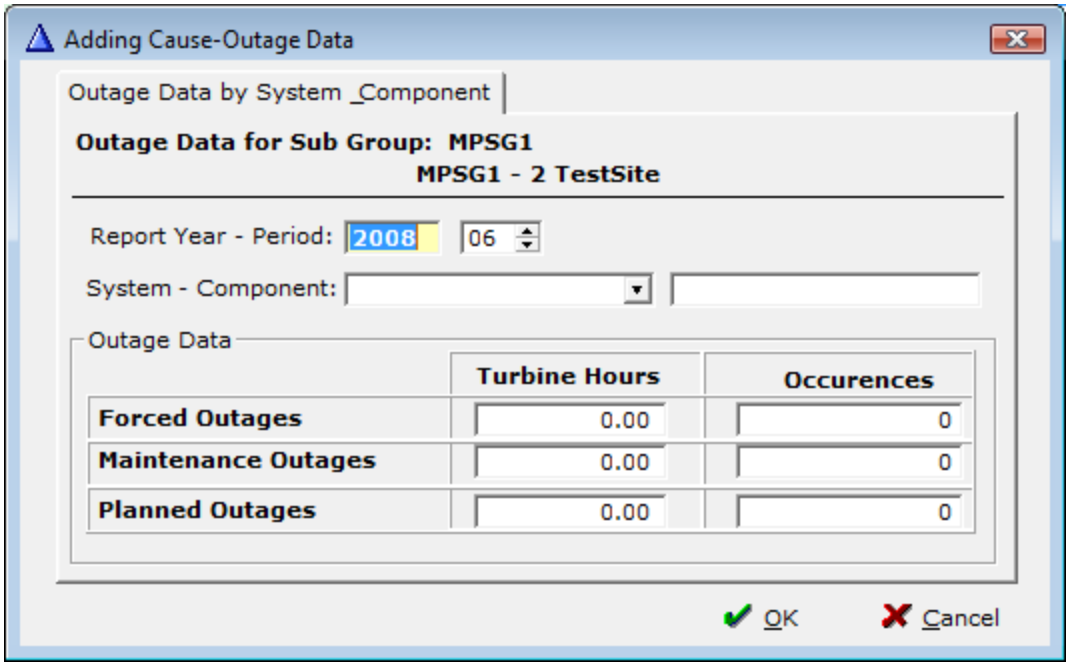
Adding Component Data

Follow the instructions detailed below to add new component data within a selected performance data record.

1. Select the desired plant, group, or sub-group from the group hierarchy.

2. From the Performance Data panel, select the desired period in which to enter outage data for.

3 Click Add Component Data at the bottom of the Outage Table panel. The Adding Cause – Outage Data window is displayed, as illustrated below.



4 From the System-Component drop down menu, select a reason for the outage.

5 Enter the total number of turbine-hours, if any, the component was on a forced outage due to the selected reason.

6 Enter the total number of occurrences, if any, the component was on a forced outage due to the selected reason.

7 Enter the total number of turbine-hours, if any, the component was on a maintenance outage due to the selected reason.

8 Enter the total number of occurrences, if any, the component was on a maintenance outage due to the selected reason.

9 Enter the total number of turbine-hours, if any, the component was on a planned outage due to the selected reason.

10 Enter the total number of occurrences, if any, the component was on a planned outage due to the selected reason.

11 Click **OK**.

The main window is displayed.

Changing Component Data

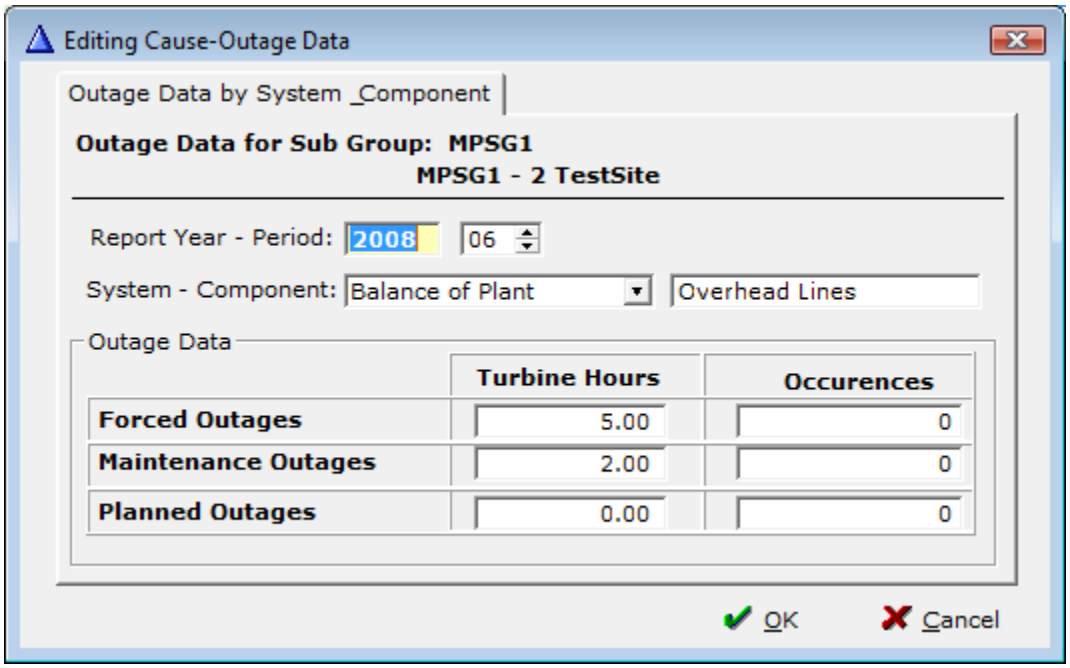
Follow the instructions detailed below to edit existing component outage data.

1 Select the desired plant, group, or sub-group from the group hierarchy.

2 Select the desired period from the performance data panel.

3 Click once on the desired outage record from the Outage Table.

4 Click Change. The Editing Cause-Outage Data window is displayed, as illustrated below.



5 Edit desired fields.

6 Click **OK**. The main window is displayed.

Deleting Component Data

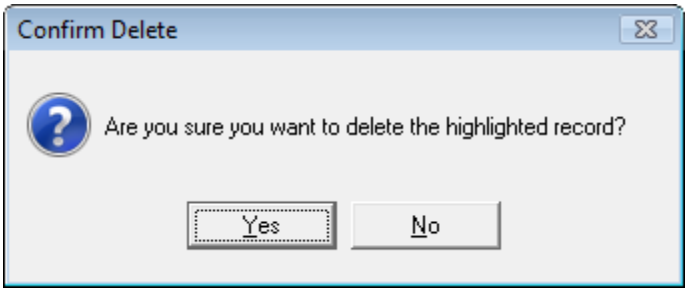
Follow the instructions detailed below to delete an outage data record.

1 Select the desired plant, group, or sub-group from the group hierarchy.

2 Select the desired period from the performance data panel.

3 Click once on the desired outage record from the Outage Table.

4 Click Delete. The Confirm Delete message is displayed, as illustrated below.



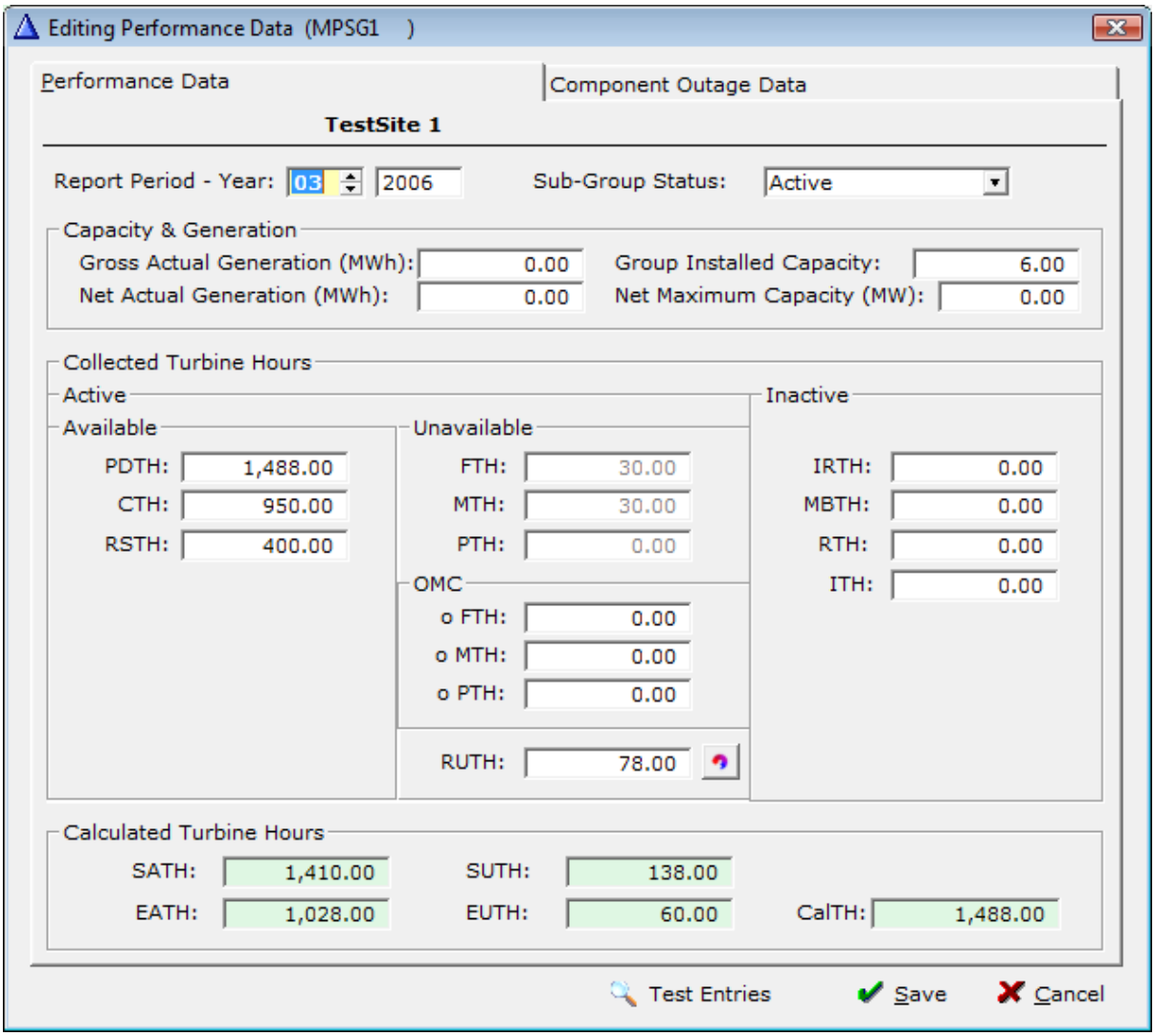
5 Click Yes to delete the selected record. The main window is displayed.

The following method can also be used to delete component data:

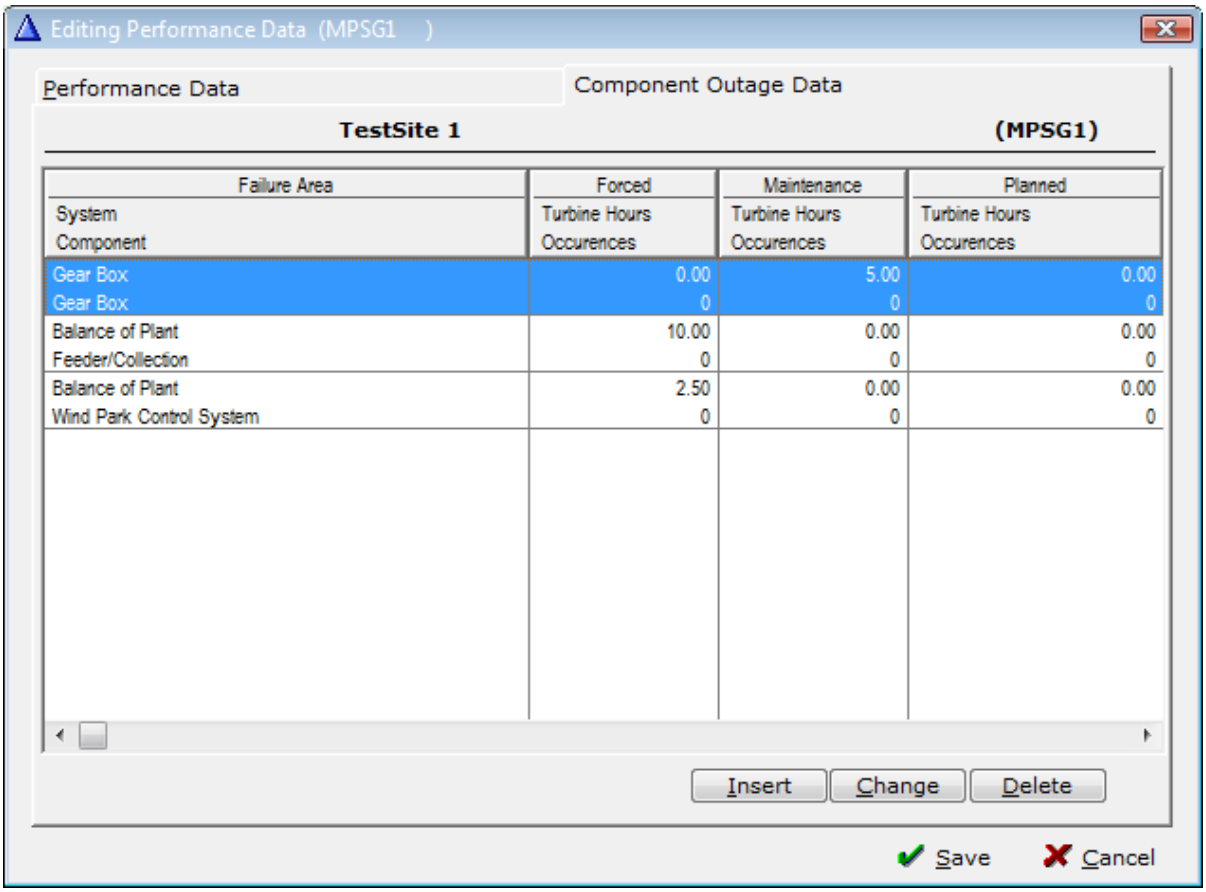
1 Select the desired plant, group, or sub-group from the group hierarchy.

2 Select the desired period from the performance data panel.

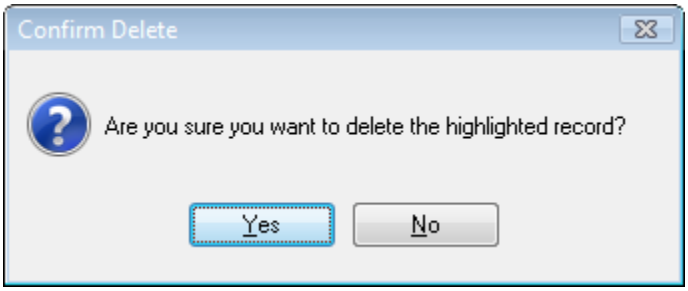
3 Click on Change, or double click the desired performance record. The Editing Performance Data window is displayed, as illustrated below.



4 Click the Component Outage Data tab. The tab is displayed as illustrated below.



5 Select the desired outage record and click Delete. A Confirm Delete message is displayed, as illustrated below.



6 Click **Yes** to delete the selected record. The Editing Performance Data window is displayed.

7 Click **Save**. Changes are saved and the main window is displayed.

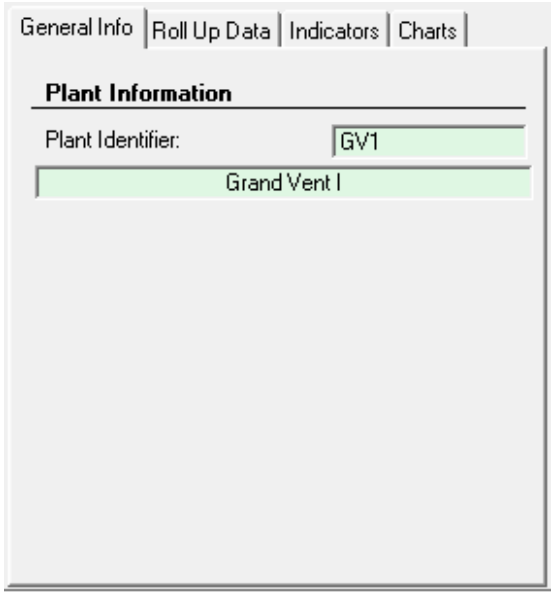
Section 7 – Information Panel

This section will explain in more detail the options available in the panel located at the bottom left of the main window.

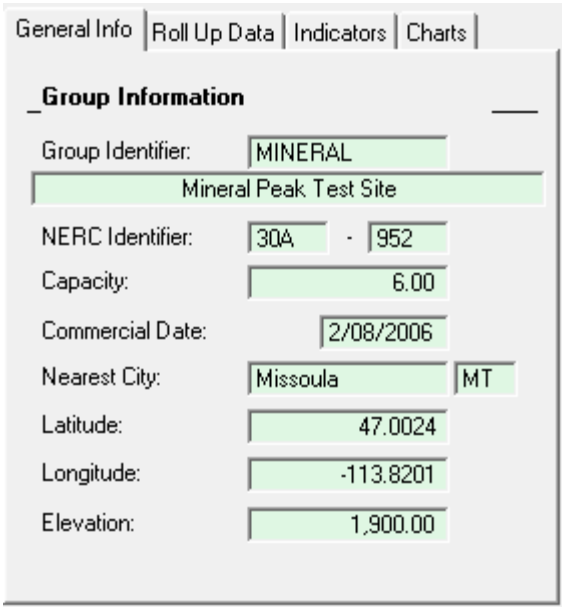
General Info

The General Info tab displays basic information on the plant, group, or sub-group that is selected in the Group Hierarchy pane at the top left of the main window. Information on this tab is displayed from previously entered data and cannot be changed.

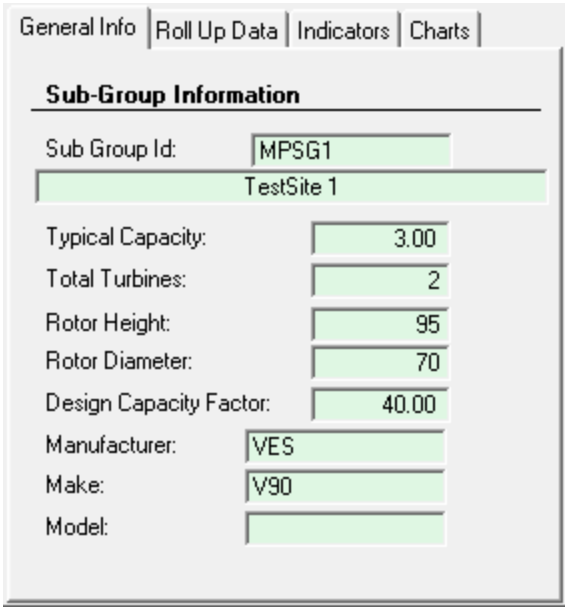
In the following example, General Plant Information of the Grand Vent I Plant is shown.



In the following example, the General Group Information of the Mineral Peak Test Site group is shown.



In the following example, the General Sub-Group Information of the TestSite 1 sub-group is shown.

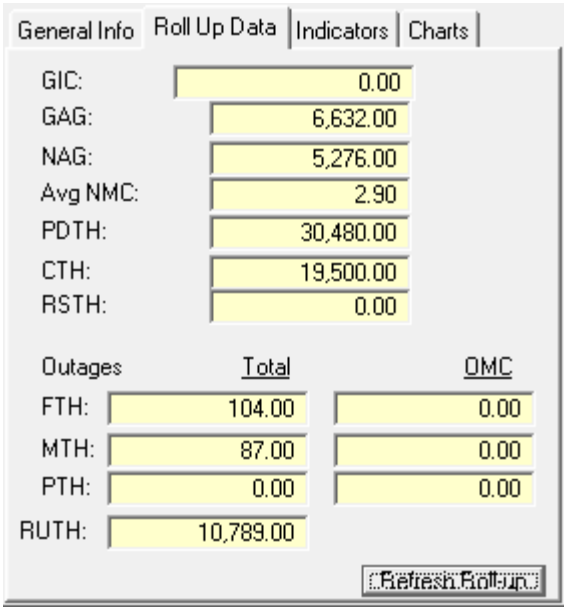


Roll-Up Data

The Roll-Up Data tab displays the cumulative amounts in each data field for all periods displayed in the Performance Data panel. A short definition of each field can be shown simply by moving the cursor over the desired field.

This data can be refreshed by clicking on the Refresh Roll-Up button at the bottom of the panel. It can also be refreshed automatically by clicking on Edit at the top of the screen, then clicking on Use Live Roll-Up from the Options drop-down.

The following example shows the cumulative data for the periods listed under the Sheep Mountain group.

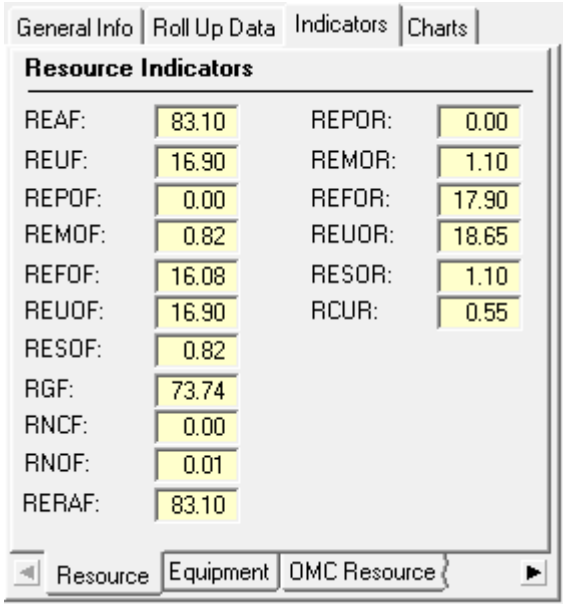


Indicators

The Indicators tab contains four sub-tabs, Resource, Equipment, OMC Resource, and OMC Equipment. The data on the Indicators tab can be refreshed by using the Refresh Roll-Up button on the Roll-Up Data tab. It can also be automatically refreshed by clicking on Edit at the top of the screen, then clicking on Use Live Roll-Up from the Options drop-down. A short definition of each field can be displayed simply by moving the cursor over the desired field. The data shown on each sub-tab is described below.

- The Resource sub-tab of the Indicators tab displays the cumulative amounts in each data field for all periods displayed in the Performance Data panel. The data shown in the fields of the Resource sub-tab corresponds to resource availability.

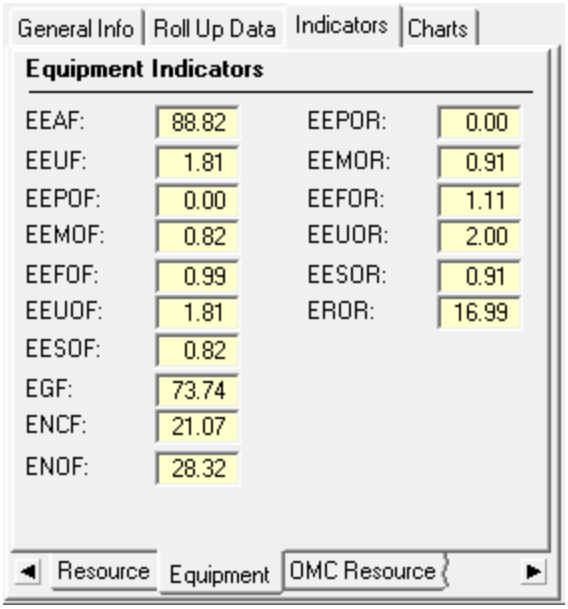
  The following example shows the Resource data for the periods under the Mineral Peak Test Site.



  For the corresponding equations for Resource Indicators, please refer to the *Wind Plant Performance Equations* section of the *Wind Turbine Terms, Definitions, and Equations* document.

- The Equipment sub-tab of the Indicators tab displays the cumulative amounts in each data field for all periods displayed in the Performance Data panel. The data shown in the fields of the Equipment sub-tab accounts for all mechanical outages.

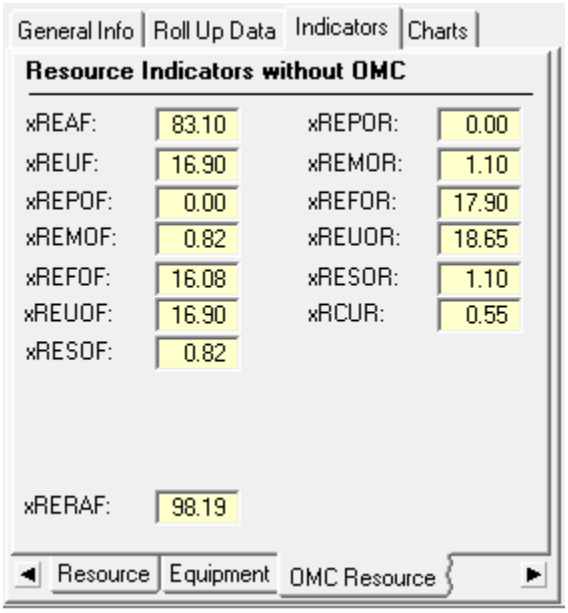
The following example shows the Equipment data for the periods under the Mineral Peak Test Site.



For the corresponding equations for Equipment Factors and Equipment Rates, please refer to the *Wind Plant Performance Equations* section of the *Wind Turbine Terms, Definitions, and Equations* document.

- The OMC Resource sub-tab of the Indicators tab displays the cumulative amounts in each data field for all periods displayed in the Performance Data panel. The data shown in the fields of the OMC Resource sub-tab corresponds to resource availability less Outside Management Control events.

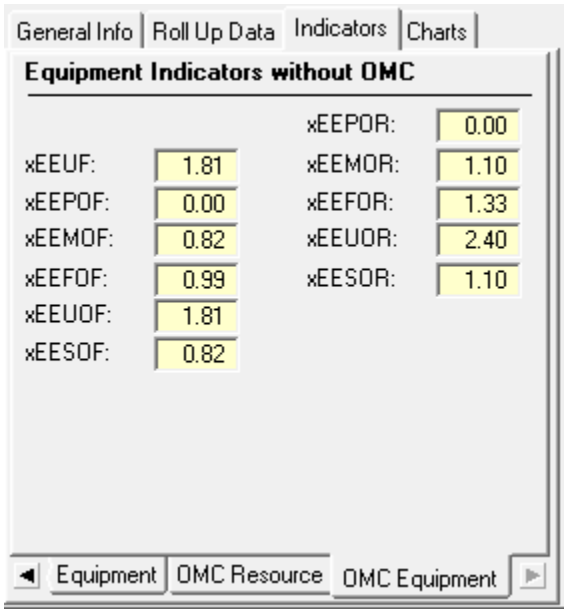
  The following example shows the OMC Resource data for the periods under the Mineral Peak Test Site.



For the corresponding equations for OMC Resource Factors and OMC Resource Rates, please refer to the *Wind Plant Performance Equations* section of the *Wind Turbine Terms, Definitions, and Equations* document.

- The OMC Equipment sub-tab of the Indicators tab displays the cumulative amounts in each data field for all periods displayed in the Performance Data panel. The data shown in the fields of the OMC Equipment sub-tab accounts for all mechanical outages less Outside Management Control events.

  The following example shows the OMC Equipment data for the periods under the Mineral Peak Test Site.



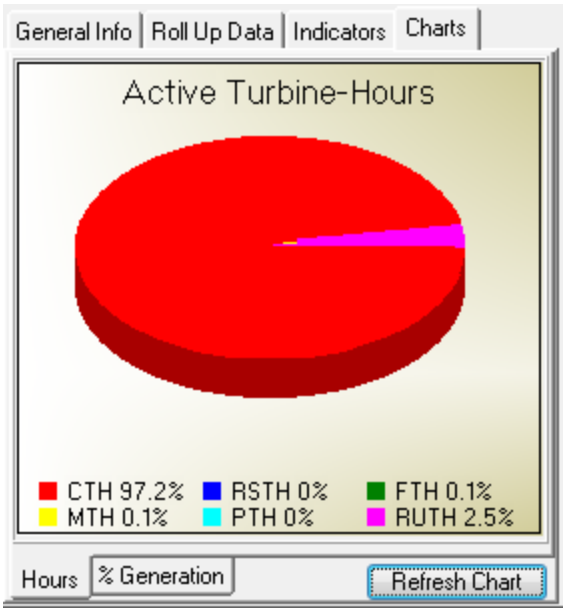
For the corresponding equations for OMC Equipment Factors and OMC Equipment Rates, please refer to the *Wind Plant Performance Equations* section of the *Wind Turbine Terms, Definitions, and Equations* document.

Charts

The Charts tab can display one of two different charts, Hours and % Generation. The data can be refreshed by clicking the Refresh Chart button at the bottom of the panel. The data can also be automatically refreshed by clicking on Edit at the top of the screen, then clicking on Use Live Roll-Up from the Options drop-down. The data displayed in each graph is described below.

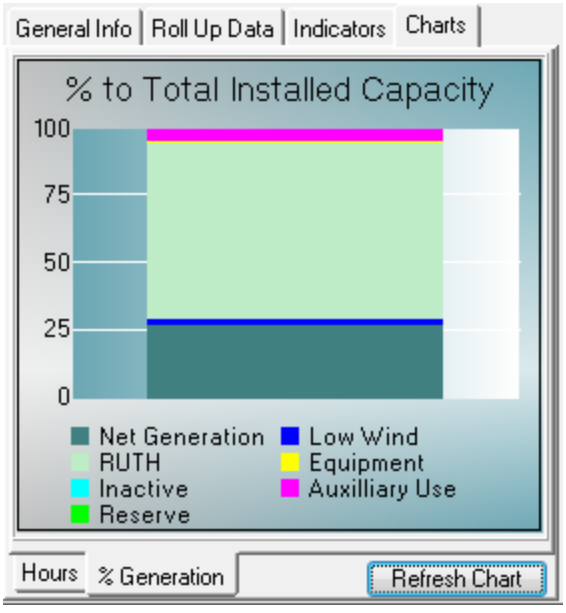
- The first chart, selected by clicking the Hours tab at the bottom of the panel, displays a pie graph of Active Turbine-Hours. The total hours translated to the chart are the cumulative turbine-hours of all the periods displayed in the Performance Data panel.

  The following example shows the Active Turbine-Hours for all the periods under the MPSG1 sub-group.



- The second chart, shown by clicking the % Generation tab at the bottom of the panel, displays a stacked bar chart showing the breakdown of the power generated and the losses out of the total generation capability. The Total Installed Capacity is the cumulative total of all the periods displayed in the Performance Data panel.

  The following example shows the % to Total Installed Capacity for the SM-GE15 sub-group.



Appendix A – CSV Files

You can import five types of files – Plant, Group, Sub-Group, Performance, and Hours. While each file is a CSV file and has a similar layout, the content of each corresponds with the set of data that is read in the program. For instance, if you wish to import Plant data, you must choose the CSV file containing the Plant data.

The CSV files to import are usually saved with the data type as part of the file name to easily differentiate between them. When exporting, the WindGen Data Entry program will automatically name them as, for example, wdplants.csv, and will give you the option of adding the current date to the file name. Files to import are usually similarly named.

The following tables explain the fields that are entered in each type of CSV file.

Note: For field names with footnotes, see *Entry Look-Up Tables* beginning on page 75.

Plants

Column	Field Name	Entry Type	Description
1	NERC Utility Code	String-3	This is the unique code assigned to the Plant by NERC.
2	Plant ID	String-10	This is a unique identification given to the Plant that is entered. This ID is referenced in all Groups, Sub-Groups, Performance data, and Hours data existing under the Plant.
3	Plant Name	String-45	This is the display name given to the Plant.

Groups

Column	Field Name	Entry Type	Description
1	Plant ID	String-10	This is the unique ID of the Plant under which the Group exists.
2	Group ID	String-10	This is a unique identification given to the Group that is entered. This ID is referenced in all Sub-Groups, Performance data, and Hours data existing under the Group.
3	Group Name	String-45	This is the display name given to the Group.

4	NERC Utility Code	String-3	This is the unique code assigned to the Group by NERC.
5	NERC Unit Code	String-3	This is the unique code assigned to the Group by NERC.
6	Capacity	Numeric-10.2	The nominal capacity of the entire Group, in MW.
7	Auxiliary Capacity	Numeric-10.2	The combined capacities of all turbines not normally connected, and not part of GIC, in MW.
8	AAWS	Numeric-3	This is the long term Annual Average Wind Speed
9	Longitude	Numeric-9.4	The degrees of longitude of the physical location of the Group.
10	Latitude	Numeric-8.4	The degrees of latitude of the physical location of the Group.
11	City	String-40	The name of the city that the Group is closest to (or resides in).
12	State	String-2	The state abbreviation where the Group is located.
13	Elevation	Numeric-10.2	The elevation of the physical location of the Group, given in meters.
14	Wind Regime$_1$	Numeric-3	This is the average topography of the area in which the Group is located. Enter code from look-up table.
15	Commercial Date	String-N10	The date, in the form MM/DD/YYYY, that the Group came online and became active.
16	SCADA Type$_2$	String-10	This describes the type of SCADA system in use. Enter code from look-up table.
17	SCADA Manufacturer$_3$	String-5	The name of the manufacturer of the SCADA system. Enter code from look-up table.
18	SCADA Model	String-10	The name of the model of the SCADA system.
19	ISO Resource ID	String-30	This is the identification given to the Group by the ISO.

Sub-Groups

Column	Field Name	Entry Type	Description
1	Plant ID	String-10	This is the unique ID of the Plant under which the Sub-Group exists.
2	Group ID	String-10	This is the unique ID of the Group under which the Sub-Group exists.
3	Sub-Group ID	String-10	This is a unique identification given to the Sub-Group that is entered. This ID is referenced in all Performance and Hours data existing under the Sub-Group.
4	NERC Utility Code	String-3	This is the unique code assigned to the Sub-Group by NERC.
5	NERC Unit Code	String-3	This is the unique code assigned to the Sub-Group by NERC.
6	Unit Code Extension	String-3	This is a unique code extension assigned to the Sub-Group by NERC.
7	Sub-Group Name	String-45	This is the display name given to the Sub-Group.
8	Commissioning Year	String-4	This is the year, in the form YYYY, that the Sub-Group was commissioned.
9	Typical Capacity	Numeric-7.2	This is the typical capacity, or MW rating, of wind turbine group.
10	Total Number of Turbines	Numeric-7	The actual number of physical turbines that exist in the Sub-Group.
11	Manufacturer$_4$	String-5	The name of the manufacturer of the turbines in the Sub-Group. Enter code from look-up table.
12	Make	String-20	The name of the make of the turbines in the Sub-Group.
13	Model	String-20	The model name of the turbines in the Sub-Group.
14	Rotor Height	Numeric-7	The height of the rotor, given in meters.
15	Rotor Diameter	Numeric-7	The diameter of the rotor, given in meters.

16	Cut-in Wind Speed	Numeric-7	This is the lowest wind speed that the turbine will start to generate power, in meters per second.
17	Low Cut-out Wind Speed	Numeric-7	This is the lowest wind speed that the turbine can continue to generate power before cutting out, in meters per second.
18	High Cut-out Wind Speed	Numeric-7	This is the highest wind speed at which the turbine is capable of generating power before cutting out, in meters per second.
19	Turbine Wind Class	String-20	Wind Class is a calculation of Wind Power Density and Wind Speed at a given height above the ground. This number is given in a range of 1-7.
20	$Turbulence_5$	Numeric-3	The average wind turbulence where the Sub-Group is located. Enter code from look-up table.
21	$Wind\ Speed_6$	Numeric-3	The average range of wind speed where the Sub-Group is located. Enter code from look-up table.
22	$Wind\ Shear_7$	Numeric-3	The average strength of the difference between wind direction and wind strength. Enter code from look-up table.

Performance

Column	Field Name	Entry Type	Description
1	Plant ID	String-10	This is the unique ID of the Plant under which the Sub-Group exists.
2	Group ID	String-10	This is the unique ID of the Group under which the Sub-Group exists.
3	Sub-Group ID	String-10	This is the unique ID of the Sub-Group for which the performance data is being entered under.
4	Report Year	String-N4	This is the year, in the form YYYY, for which the performance data is being entered.
5	Report Period	String-N2	This is the period (month), in the form MM, for which the performance data is being entered.
6	NERC Utility Code	String-3	This is the unique code assigned to the Sub-Group by NERC.
7	NERC Unit Code	String-3	This is the unique code assigned to the Sub-Group by NERC.
8	$Status_8$	String-2	This is the status of the entire Sub-Group during the year/period for which the data is entered. Enter code from look-up table.
9	GAG	Numeric-12.2	This is the gross actual generation, measured in MWh.
10	NAG	Numeric-12.2	This is the net actual generation, which is recorded at the revenue meter. It is measured in MWh.
11	NMC	Numeric-10.2	This is the net maximum capacity.
12	CalTH	Numeric-12.2	This is the Calendar Turbine-Hours, which is the total number of hours during one period (month).
13	PDTH	Numeric-12.2	This is the Period Turbine-Hours, which is the number of Calendar Hours that the equipment is in an active state.

14	CTH	Numeric-14.2	Contactor turbine-hours is the number of Turbine-Hours that the contactors are closed and generation is provided to the grid.
15	RSTH	Numeric-12.2	Reserve shutdown turbine-hours is the sum of all Turbine-Hours that the Sub-Group is available to the system at a reduced capacity.
16	RUTH	Numeric-12.2	Resource unavailable turbine-hours is the number of Turbine-Hours the Sub-Group is not producing electricity.
17	FTH	Numeric-12.2	Forced turbine-hours is the total number of Turbine-Hours that the Sub-Group is off-line due to Forced Events.
18	oFTH	Numeric-12.2	OMC forced turbine-hours is a sub-set of FTH, accounting for Forced Turbine-Hours that are due to events deemed to be outside of management control.
19	MTH	Numeric-12.2	Maintenance turbine-hours is the total number of Turbine-Hours that the Sub-Group is off-line due to Maintenance Events.
20	oMTH	Numeric-12.2	OMC maintenance turbine-hours is a sub-set of MTH, accounting for Maintenance Turbine-Hours that are due to events deemed to be outside of management control.
21	PTH	Numeric-12.2	Planned turbine-hours is the total number of Turbine-Hours that the Sub-Group is off-line due to Planned Events.
22	oPTH	Numeric-12.2	OMC planned turbine-hours is a sub-set of PTH, accounting for Planned Turbine-Hours that are due to events deemed to be outside of management control.
23	SATH	Numeric-12.2	Site available turbine-hours is the PDTH minus the RUTH.
24	SUTH	Numeric-12.2	Site unavailable turbine-hours is the sum of the PTH, FTH, MTH, and RUTH.

25	EATH	Numeric-12.2	Equipment available turbine-hours is the sum of the CTH and RUTH.
26	EUTH	Numeric-12.2	Equipment unavailable turbine-hours is the sum of PTH, FTH, and MTH.
27	IRTH	Numeric-12.2	Inactive reserve turbine-hours is the total number of Turbine-Hours in a period being reported that the Sub-Group is in the Inactive Reserve State.
28	MBTH	Numeric-12.2	Mothballed turbine-hours is the total number of Turbine-Hours in a period being reported that the Sub-Group is in the Mothballed State
29	RTH	Numeric-12.2	Retired unit turbine-hours is the total number of Turbine-hours in a period being reported that the Sub-Group is in the Retired State.

Hours

Column	Field Name	Entry Type	Description
1	Plant ID	String-10	This is the unique ID of the Plant under which the Sub-Group exists.
2	Group ID	String-10	This is the unique ID of the Group under which the Sub-Group exists.
3	Sub-Group ID	String-10	This is the unique ID of the Sub-Group for which the performance data is being entered under.
4	Report Year	String-N4	This is the year, in the format YYYY, for which the outage data is being entered.
5	Report Period (month)	String-N2	This is the period (month), in the format MM, for which the outage data is being entered.
6	NERC Utility Code	String-3	This is the unique code assigned by NERC to the Sub-Group for which the outage data is being entered.
7	NERC Unit Code	String-3	This is the unique code assigned by NERC to the Sub-Group for which the outage data is being entered.
8	System$_9$	Numeric-14	The system that was responsible for the outage. Enter code from look-up table.
9	Component ID$_{10}$	Numeric-14	The specific component of the system responsible for the outage. Enter code from look-up table.
10	Cause Code	String-N4	
11	Forced Derate Hours	Numeric-10.2	The total number of hours that the Sub-Group was on Forced Derate during the entered period for the reason stated.

12	Number of Forced Derates	Numeric-14	The total number of occurrences that the Sub-Group was on Forced Derate during the entered period for the reason stated.
13	Maintenance Derate Hours	Numeric-10.2	The total number of hours that the Sub-Group was on Maintenance Derate during the given period for the given reason.
14	Number of Maintenance Derates	Numeric-14	The total number of occurrences that the Sub-Group was on Maintenance Derate during the entered period for the reason stated.
15	Planned Derate hours	Numeric-10.2	The total number of hours that the Sub-Group was on Planned Derate during the entered period for the reason stated.
16	Number of Planned Derates	Numeric-14	The total number of occurrences that the Sub-Group was on Planned Derate during the entered period for the reason stated.

Entry Look-Up Tables

1. Wind Regime	Entry
Seashore	1
Plain	2
Plateau	3
Hills	4
Mountain	5
Ridge	6
56Kbps DDS	7

2. SCADA Type	Entry
Analog	1
Digital	2
IP	3
Ethernet	4
Frame Relay	5
Private Wire	6

3. SCADA Manufacturer	Entry
Emerson	ES
Garrad Hassan	GH
General Electric Co.	GE
Horizon Wind Energy	HWE
Mita-Teknik	MTK
Scadabase	SCB
Second Wind	SC
Vestas	VES

4. Turbine Manufacturer	Entry
Denertec S.A.C.	DT
Earth Wind and Power LLC	EWP
Enercon Gmbh	EC
Green Energy Technologies	GET
Nordex	NX
Prime Wind Power International	PW
R.E. Power Systems Ag	REP
Stock Equipment Co.	SE
Urban Green Energy	UGE
Vestas	VES
Wind Energy Solutions	WIS
Winwind	WW

5. Turbulence	Entry
Low	1
Mild	2
Moderate	3
Strong	4
Severe	5

6. Wind Speed	Entry
0-4 m/s	1
4-8 m/s	2
6-11 m/s	3
11-14 m/s	4
14-17 m/s	5
17-21 m/s	6
21-24 m/s	7
24-30 m/s	8
30-32 m/s	9
>32 m/s	10

7. Wind Shear	Entry
Smooth	1
Moderately Rough	2
Rough	3
Very Rough	4

8. Status	Entry
Active Status	AC
Inactive Reserve Status	IR
Mothballed Status	MB
Retired Status	RU

9. System: The following table lists available systems and the code to key in for each system.

System	Entry
Balance of Plant	143
Brake	137
Control System	142
Drive Train	136
Electrical	144
External	145
Gear Box	135
Generator/Exciter	141
Hydraulic System	140
Pitch System	139
Rotor	134
Structures	133
Yaw System	138

10. Component: The following tables list available components for each system and the code to key in for each component.

System	Component	Entry
Balance of Plant	General	674
	Feeder/Collection	650
	Metering and Relays	655
	Overhead Lines	652
	Pad Mount-Multiple WTG	651
	Preventative Maintenance	682
	SCADA	656
	Site Reactive Power Comp	654
	Substation	653
	Wind Park Control System	657

System	Component	Entry
Brake	General	673
	High Speed Shaft Brake	617
	Mechanical Lock	618

System	Component	Entry
Control System	General	672
	Cabinet Cooling/Heating	648
	Cold Weather Control	647
	Control Com Links Top and Bottom	644
	Low Voltage Control Wiring	638
	Processor	645
	Processor Cooling	646
	Reactive Power Control	640
	Sensors	642
	Software	643
	Voltage Regulation	639
	VRCC	641
	Windvane and Anemometer	649

System	Component	Entry
Drive Train	General	671
	High Speed Coupling	615
	Main Bearings	613
	Main Shaft	614
	Transmission Shaft	616

System	Component	Entry
Electrical	General	670
	Circuit Breakers and Switches	661
	Individual Pad Mounted Xformers	662
	Power Compensation-WTG	660
	Power Converters	658
	Transmission Cables	659

System	Component	Entry
External	General	681
	Catastrophe (OMC)	680
	Economic (OMC)	679
	Off-Taker Transmission & Distribution	675
	Off-Taker Transmission & Distribution (OMC)	683
	Weather – Ice (OMC)	677
	Weather – Lightning	678
	Weather - Temperature	676

System	Component	Entry
Gear Box	General	669
	Gear Box	608
	Gear Box Heating/Cooling	609
	Gear Box Oil System	610
	Gearbox Filtration	611
	Torque Arm System	612

System	Component	Entry
Generator/Exciter	General	668
	Exciter	634
	Generator	631
	Generator Bearings	632
	Generator Cooling Systems	636
	Generator Lube Oil Systems	633
	Generator Shaft	635
	Wiring to Gen Terminals	637

System	Component	Entry
Hydraulic System	General	667
	Common Pump and Motor	627
	Filtering System	629
	Hoses, Reservoirs, Valves	630
	Hydraulic Accumulator	628

System	Component	Entry
Pitch System	General	666
	Electrical	626
	Mechanical/Electrical	624
	Pitch Hydraulics	625

System	Component	Entry
Rotor	General	665
	Aerodynamic Brake	602
	Blade Pitch Bearing	603
	Blades	600
	Deicing Systems	604
	Hub	601
	Lightning Protection	605
	Nose Cone	606

System	Component	Entry
Structures	General	664
	FAA Lighting	598
	Foundations	595
	MASS/Harmonic Damp	599
	Nacelle	593
	Nacelle Heating & Cooling	597
	Paint & Coatings	596
	Towers	594

System	Component	Entry
Yaw System	General	663
	Slew Ring	620
	Yaw Dampening	622
	Yaw Gear	621
	Yaw Lubrication Systems	623
	Yaw Motors/Hydraulics	619

Appendix B – Import Errors

While importing CSV files, a number of errors may occur. The following lists and describes all possible errors that may occur.

No Plant ID
This error may occur when importing Hours, Performance, Sub-Group, Group, or Plant files. This happens when there is no Plant ID entered in the CSV file being imported.

No Group ID
This error may occur when importing Hours, Performance, Sub-Group, or Group files. This happens when there is no Group ID entered in the CSV file being imported.

No Sub-Group ID
This error may occur when importing Hours, Performance, or Sub-Group files. This happens when there is no Sub-Group ID entered in the CSV file being imported.

Plant ID Not Found
This error may occur when importing Performance, Sub-Group, or Group files. This happens when the Plant ID entered in the CSV file does not match any found within the program. This would create an orphan record and therefore is not imported.

Group ID Not Found
This error may occur when importing Performance, Sub-Group, or Group files. This happens when the Group ID entered in the CSV file does not match any found within the program. This would create an orphan record and therefore is not imported.

Sub-Group ID Not Found
This error may occur when importing Performance, or Sub-Group files. This happens when the Sub-Group ID entered in the CSV file does not match any found within the program. This would create an orphan record and therefore is not imported.

Performance ID Not Found
This error may occur when importing Hours files. This happens when the data (Sub-Group, Group, Plant, year, or period) in the Hours CSV file does not match any found in any corresponding Performance file. This would create an orphan record and therefore is not imported.

Bad Period/Year
This error may occur when importing Hours or Performance files. This happens when the entered year is earlier than 1980 or greater than the current year, or if the entered period (month) is not within the range of 1-12.

Invalid System
This error may occur when importing Hours files. This happens when the System Identifier does not match any found within the program.

Hours Do Not Balance

This error occurs when the fields in the Performance record file do not balance according to the following formulas:

CalTH = PDTH + ITH

PDTH = CTH + RSTH + FTH + MTH + PTH + RUTH

ITH = IRTH + MBTH + RTH

RUTH = PDTH – (CTH + RSTH + FTH + MTH + PTH)

No Name or Description

This error may occur when importing Sub-Group, Group, or Plant files. This happens when the name/description field is blank in the incoming CSV file.

File Error During Save

This error occurs when there is a file error when saving the record. There may be nothing wrong with the record. This may indicate hard disk errors.