

Auxiliary Files

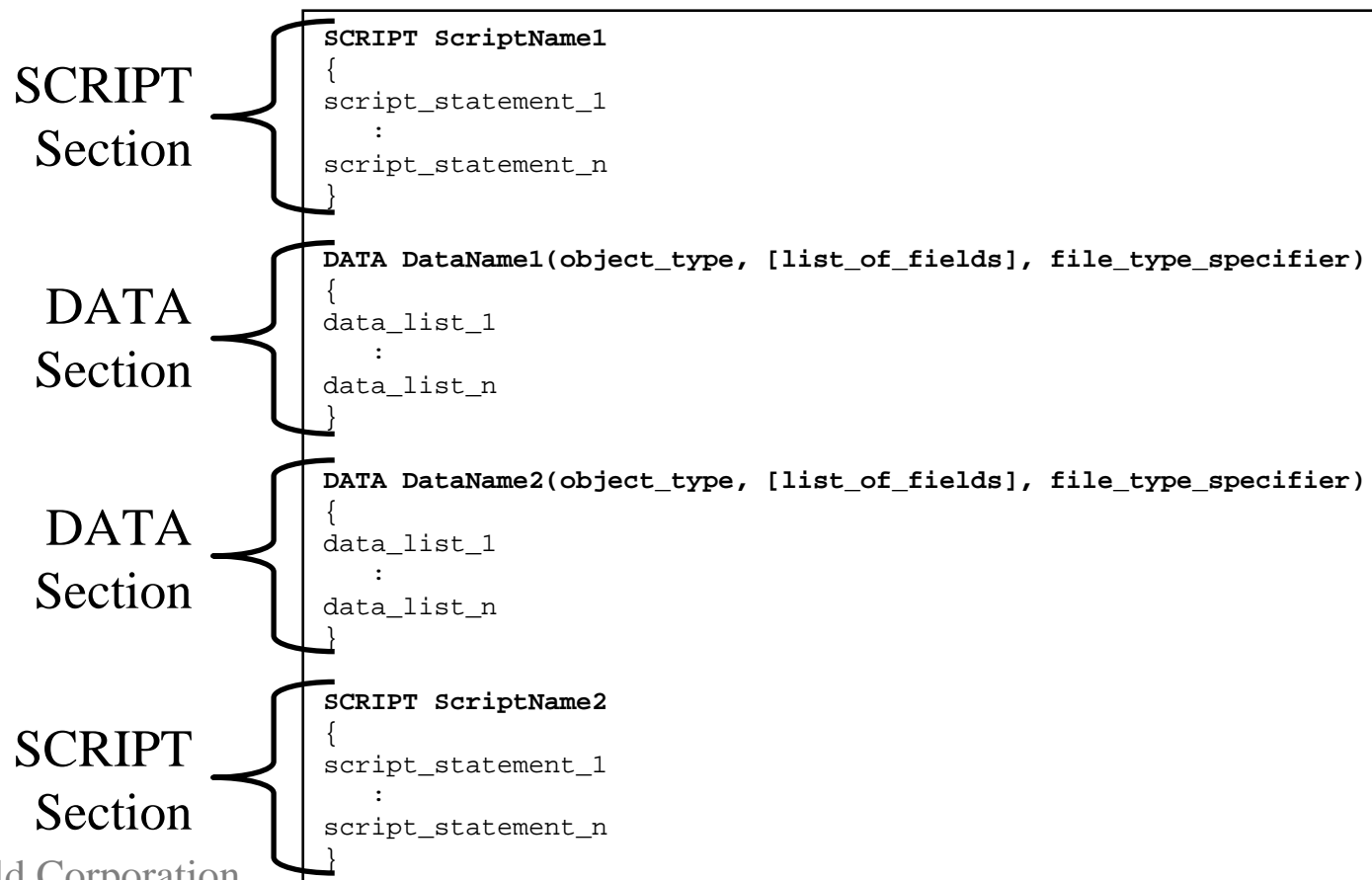


- PowerWorld Simulator data can be stored and edited in a text file format
- A scripting language is available for modifying data and automatically running PowerWorld Simulator commands
- The auxiliary (*.aux) file format accomplishes both functions
- Beginning with Simulator 12, the auxiliary file format has been extended to one-line diagrams (*.axd)

Auxiliary File Format Overview



- Has two types of “Sections”.
 - There is no limit to the number of sections in a file



Auxiliary File SCRIPT Sections



- Start with the word **SCRIPT**
- An optional script name may follow
 - For use with the LoadScript Action
- Then a block of script actions follow enclosed in curly braces { }
- Each script statement must end in a semicolon ;
- All the script actions allowed will be covered in a later set of slides.

```
SCRIPT ScriptName1
{
script_statement_1
    :
script_statement_n
}
```

Auxiliary File DATA Sections



- Start with the word DATA
- An optional data name may follow
 - For use with the LoadData Action
- Following this is a list of parameters enclosed in parenthesis
 - (object_type,[list_of_fields],file_type_specifier)
 - object_type
 - [list_of_fields]
 - file_type_specifier

```
DATA DataName1(object_type, [list_of_fields], file_type_specifier)
{
  data_list_1
  :
  data_list_n
}
```

DATA Section

Object_Type Parameter



- Identifies the type of object or data element the DATA section describes or models.
- Some examples include

Area	DCTransmissionLine	PartPoint
ATC_Options	Direction	PVCurve_Options
ATCExtraMonitor	Equiv_Options	QVCurve_Options
ATCGeneratorChange	Filter	ReactiveCapability
ATCInterfaceChange	Gen	Scale_Options
ATCLineChange	InjectionGroup	Schedule
ATCScenario	Interface	Shunt
ATCZoneChange	InterfaceElement	Sim_Environment_Options
BidCurve	Limit_Monitoring_Options	Sim_Misc_Options
Branch	LimitSet	Sim_Simulation_Options
Bus	LimitViol	Sim_Solution_Options
ColumnInfo	Load	StudyMWTransactions
Condition	LoadScale	Substation
Contingency	ModelCondition	SuperArea
Ctg_Options	ModelFilter	TransferLimiter
CTGElement	MSLine	Transformer
CustomExpression	MWTransaction	XFCorrection
DataGrid	OPF_Options	Zone
	OwnerObject	

DATA Section

list_of_fields Parameter



- Lists the types of values the records in the DATA section contain.
- The order of the fields dictate the order that fields will be read from the DATA section
- Simulator recognizes over 2,500 fields
 - Only a small subset will be used with a particular type of object
 - A list of available fields for each objecttype may be obtained on the Windows Ribbon Tab. On the Auxiliary Files Ribbon Group, choose **Export Case Object Fields** → **Text File** or **Send To Excel**

DATA Section

list_of_fields Parameter



- Specifications for a list_of_fields
 - Must be encompassed in brackets []
 - May take up several lines of text
 - You may use the Simulator comment string //
 - Simulator will ignore all text to the right of the double slash
 - Blank lines, or lines which begin with the comment string will be ignored
 - Field Names must be separated by commas
 - Field Names may be optionally augmented with a field location integer (by default, we assume Location is 0)
 - Format is *Fieldname:Location*
 - LineMW or LineMW:0 – means MW flow at from bus
 - LineMW:1 – means MW flow at to bus

DATA Section

Key Fields



- Each objecttype has a few fields that serve as *key fields* for Simulator.
- These fields must be included in the `list_of_fields`.
 - Buses: *BusNum*.
 - Lines: *BusNum*, *BusNum:1*, *LineCircuit*
 - Loads: *BusNum*, *GenID*.
- You can get a list of the key fields by going to the Windows Ribbon Tab. On the Auxiliary Files Ribbon Group, choose **Export Case Object Fields** → **Text File** or **Send To Excel**
 - The key fields will be denoted in this output with asterisks (*1*, *2*, and *3*)

DATA Section

Secondary Key Fields



- Secondary key fields
 - Often represent a combination of Name/Nominal kV for bus-related objects
 - The secondary key fields will be denoted in this output with asterisks (*A*, *B*, and *C*)
- When pasting into Simulator, we first look to see if the key fields are available. If they are not, then we look for the secondary key fields and use them instead.

DATA Section Required Fields



- You can also read in new objects from the DATA Section of an AUX file.
- Be careful. You must provide all required data regarding the object.
- For instance, if you create a bus you should include an area number and a zone number.
- Required Fields can be highlighted in green by using the Highlight Key/Required fields options
 - In the Display/Column Options
 - In the heading caption of the case info display

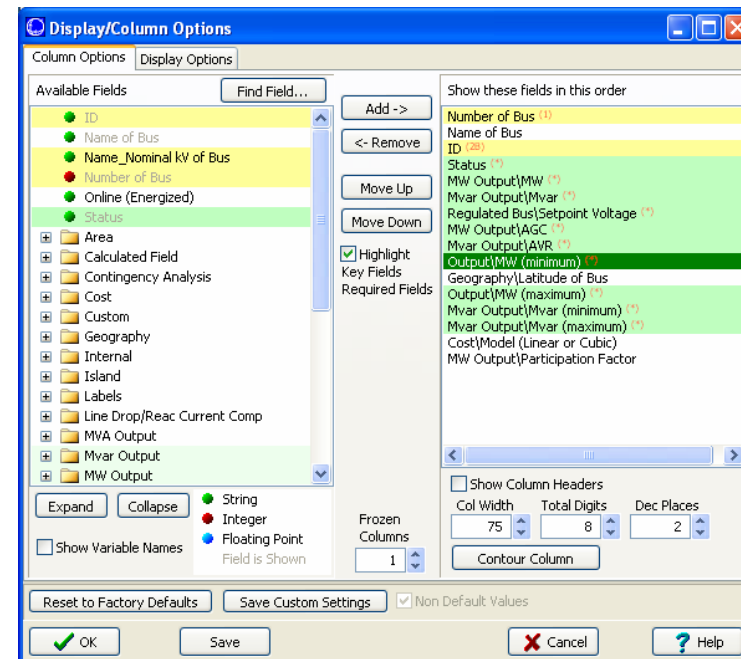
Finding Key and Required Fields in the Simulator Interface



- Key Fields are yellow, Required Fields are Green

	Number	Name	ID	Status	Gen MW	Gen Mvar	Set Volt	AGC	AVR	Min MW	Max MW	Min Mvar	Max Mvar	Cost Model	Part. Factor
1	1	One	1	Closed	101.85	5.25	1.05	YES	YES	100.00	400.00	-9900.00	9900.00	Cubic	1.00
2	2	Two	1	Closed	170.08	33.24	1.04	YES	YES	150.00	500.00	-9900.00	9900.00	Cubic	1.00
3	4	Four	1	Closed	95.03	19.99	1.00	YES	YES	50.00	200.00	-9900.00	9900.00	Cubic	1.00
4	6	Six	1	Closed	200.33	-6.59	1.04	YES	YES	150.00	500.00	-9900.00	9900.00	Cubic	1.00
5	7	Seven	1	Closed	200.65	51.29	1.04	YES	YES	0.00	600.00	-99999.00	99999.00	Cubic	1.00

- Or in the Display/Column Options Dialog



DATA Section

file_type_specifier Parameter



- Simulator presently accepts two values
 - none specified
 - Fields which follow are space-delimited
 - CSV
 - Fields which follow are comma-separated

DATA Section

Data List



- Following the argument list describing the DATA section, the Data List is given
- Starts with a left curly brace {
- Ends with a right curly brace }
 - Right curly brace must appear on its own line of text
- Between the curly braces, any number of data lists can be entered.
 - Each list represents a single object in Simulator

```
DATA DataName1(object_type, [list_of_fields], file_type_specifier)
{
data_list_1
:
data_list_n
}
```

DATA Section

Data List



- Specifications of a data list
 - May take up several lines of text
 - Simulator will read the number of fields specified in `list_of_fields`
 - Each new data object must start on its own line of text.
 - You may use the Simulator comment string `//`
 - Simulator will ignore all text to the right of the double slash
 - Blank lines, or lines which begin with the comment string will be ignored
 - Remember that the right curly brace must appear on its own line at the end of the `data_list`.
 - Fields separated by space or comma depending on `file_type_specifier`
 - Strings can be enclosed in double quotes, but this is not required.
 - You should however always enclose strings that contain spaces (or commas) in quotes. Otherwise, strings containing commas would cause errors for comma-delimited files, and spaces would cause errors for space-delimited formatted files.

Example DATA Section



DATA object_type list_of_fields: Note enclosed in brackets []

```
DATA (BRANCH, [BusNum,BusName,BusNum:1,BusName:1,LineCircuit,LineStatus,LineXfmr,LineR,LineX, // comment
// comments can appear here
LineC,LineAMVA,LineBMVA,LineCMVA])
{
//--comments can appear here-----
// Num  Name      ToNum  ToName  CKT   Status  Xfmr?   R       X       C       Alimit  Blimit  Climit
//-----
  1 "ROANSpra"   964 "GIBCRK C" " 1" "Closed" "No"    0.00690 0.03980 0.01080 236.0   236.0   236.0
  1 "ROANSpra"    4 "IOLA" " 1" "Closed" "No"    0.00828 0.04776 0.01296 236.0   236.0   236.0
  5 "IOLA"        "    4 "IOLA" " 1" "Closed" "Yes"   0.00763 0.14166 0.00000  60.0    60.0    60.0
  5 "IOLA"        "   13 "KEITH" " 1" "Closed" "No"    0.13735 0.12184 0.00175  24.0    24.0    24.0
  5 "IOLA"        "    9 "BEDIAS" " 1" "Closed" "No"    0.01980 0.11477 0.00194 118.0   118.0   118.0
  9 "BEDIAS"      "   25 "NTHZULCH" " 1" "Closed" "No"    0.03173 0.18395 0.00312  88.0    118.0   118.0
 13 "KEITH"       "   17 "CARLOSSW" " 1" "Closed" "No"    0.08233 0.07303 0.00105  24.0    24.0    24.0
 17 "CARLOSSW"   "   29 "BOONVIL" " 1" "Closed" "No"    0.21753 0.19295 0.00277  24.0    24.0    24.0
 17 "CARLOSSW"   "   21 "CARLOS" " 1" "Closed" "No"
// data can appear on more than one line. It just read a field for each entry in the list_of fields
      0.06540 0.10810 0.00160      35.0      35.0      35.0
 25 "NTHZULCH"   "   48 "HLTOPLKS" " 1" "Closed" "No"    0.04232 0.24532 0.00416  88.0    118.0   118.0
//-----
}
```

Note: "GIBCRK C" needs double quotes because it has a space in the name
IOLA may optionally have quotes

Start and End Data Lists

DATA Section

SubData



- For some object_types, the DATA section does not provide an adequate method of defining information.
- For these special instances, SUBDATA sections are optionally added to each data list.

```
DATA (object_type, [list_of_fields], file_type_specifier)
{
value_list_1
  <SUBDATA subobject_type1>
    precise format describing an object_type1
    precise format describing an object_type1
    :
  </SUBDATA>
  <SUBDATA subobject_type2>
    precise format describing an object_type2
    precise format describing an object_type2
    :
  </SUBDATA>
value_list_2
  :
value_list_n
}
```

DATA Section

SubData



- Starts with tag `<SUBDATA subobject_type>`
- Ends with tag `</SUBDATA>`
- Inside the tags, you must follow specified format for the respective `subobject_type`.
 - Values must appear in a precisely defined order
 - A list of the subdata sections for each kind of `object_type` follow
 - For detailed description of the precisely defined format for each subdata section, see the online help

SubData Sections allowed for each kind of object_type



- Contingency
 - CTGElement, LimitViol, and Sim_Solution_Options,
- CTG_Options
 - Sim_Solution_Options
- Filter
 - Condition
- Gen
 - BidCurve and ReactiveCapability
- Load
 - BidCurve
- MultiSectionLine

SubData Sections allowed for each kind of object_type



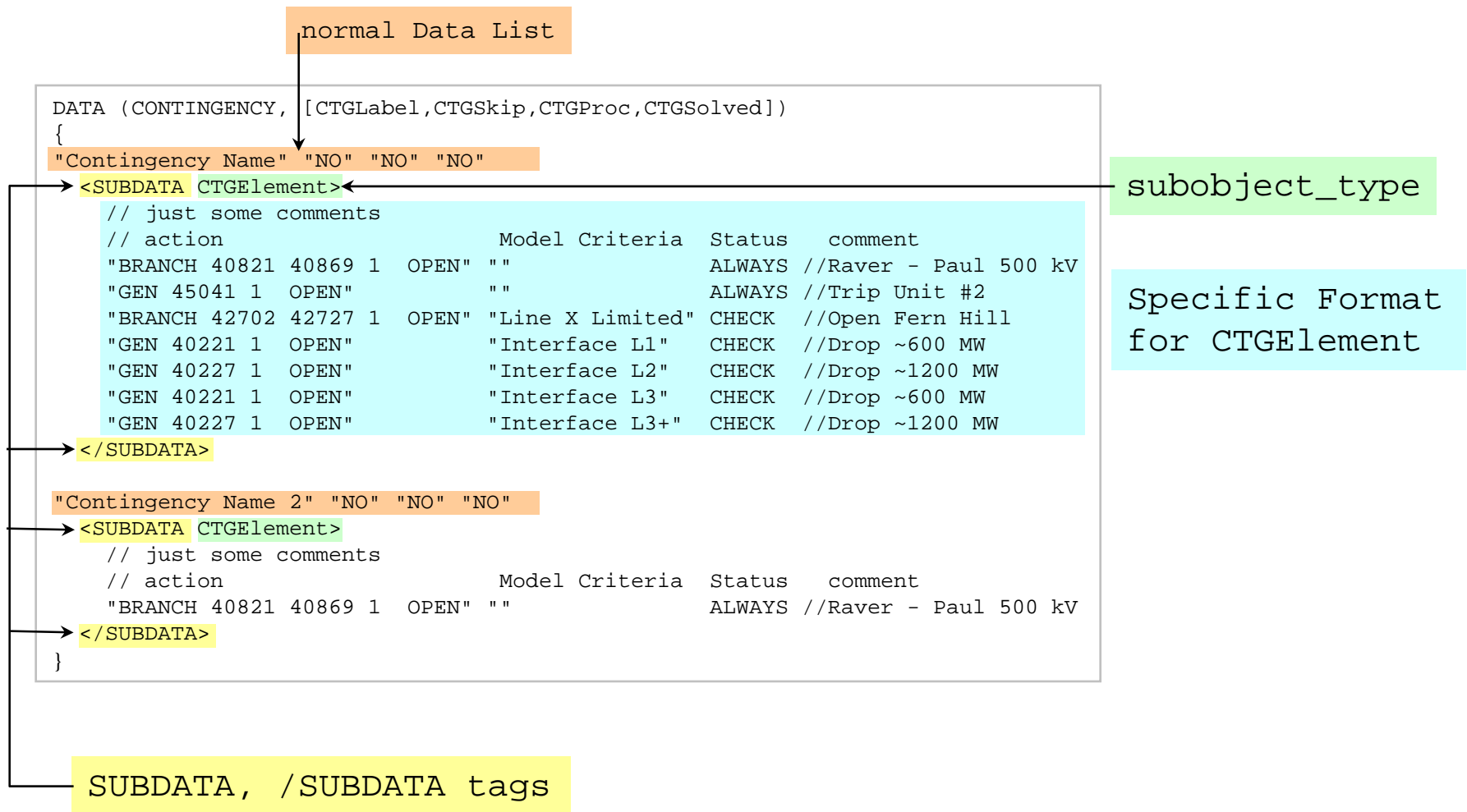
- InjectionGroup
 - PartPoint
- Interface
 - InterfaceElement
- ModelCondition
 - Condition
- ModelFilter
 - ModelCondition
- Owner
 - Bus, Load, Gen, Branch

SubData Sections allowed for each kind of object_type



- DataGrid
 - ColumnInfo
- ATCScenario
 - TransferLimiter, ATCExtraMonitor

Example DATA Section with SubData



Correlation of Case Info Display to an Auxiliary DATA Section



```

DATA GEN, [ BusNum, BusName, GenID, GenStatus, GenMW, GenMVR, GenVoltSet, GenAGCable, GenAVRable,
  GenMWMin, GenMWMax, GenMVRMin, GenMVRMax, GenCostModel, GenParFac ]
{
  1 "One"      " " "1" "Closed"  101.85  5.25  1.05 "YES" "YES"  100.00  400.00 -9900.00  9900.00 "Cubic"  1.00
  2 "Two"      " " "1" "Closed"  170.08  33.24  1.04 "YES" "YES"  150.00  500.00 -9900.00  9900.00 "Cubic"  1.00
  4 "Four"     " " "1" "Closed"   95.03  19.99  1.00 "YES" "YES"   50.00  200.00 -9900.00  9900.00 "Cubic"  1.00
  6 "Six"      " " "1" "Closed"  200.33  -6.59  1.04 "YES" "YES"  150.00  500.00 -9900.00  9900.00 "Cubic"  1.00
  7 "Seven"    " " "1" "Closed"  200.65  51.29  1.04 "YES" "YES"   0.00  600.00 -99999.00 99999.00 "Cubic"  1.00
}
  
```

Object Type

Data

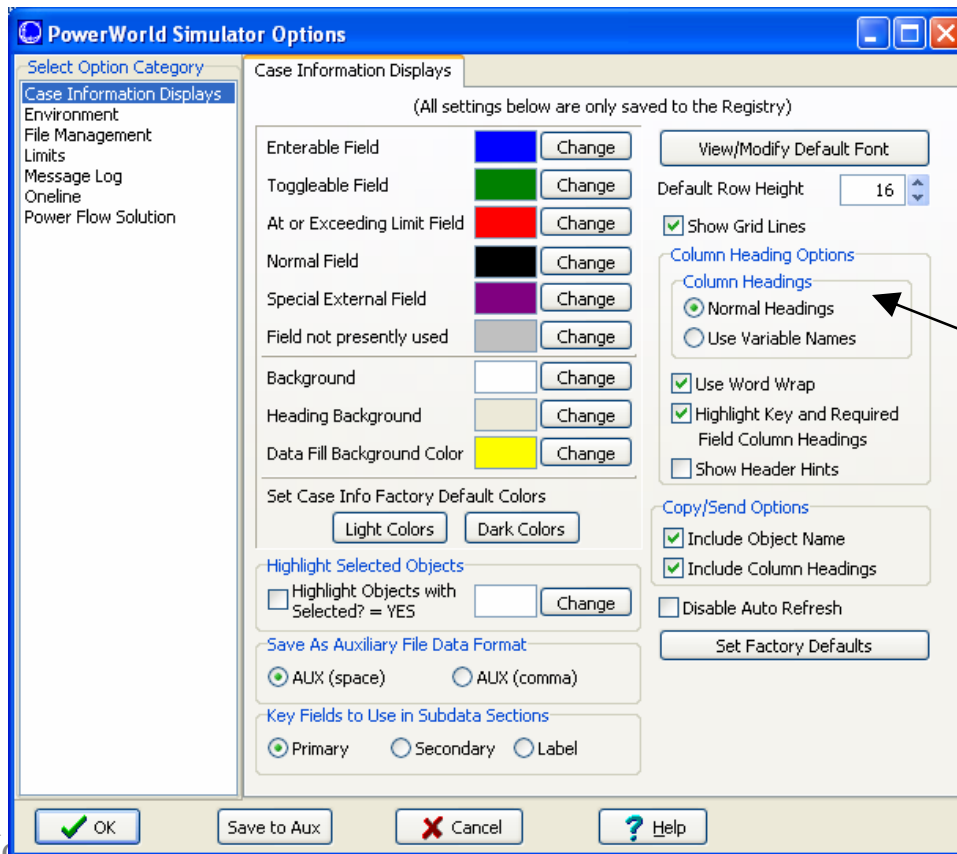
Field

Number	Name	ID	Status	Gen MW	Gen Mvar	Set Volt	AGC	AVR	Min MW	Max MW	Min Mvar	Max Mvar	Cost Model	Part. Factor
1	One	1	Closed	101.85	5.25	1.05	YES	YES	100.00	400.00	-9900.00	9900.00	Cubic	1.00
2	Two	1	Closed	170.08	33.24	1.04	YES	YES	150.00	500.00	-9900.00	9900.00	Cubic	1.00
3	Four	1	Closed	95.03	19.99	1.00	YES	YES	50.00	200.00	-9900.00	9900.00	Cubic	1.00
4	Six	1	Closed	200.33	-6.59	1.04	YES	YES	150.00	500.00	-9900.00	9900.00	Cubic	1.00
5	Seven	1	Closed	200.65	51.29	1.04	YES	YES	0.00	600.00	-99999.00	99999.00	Cubic	1.00

Option For changing Case Info Display Column Heading to Variables



- Choose **Options** → **Simulator Options**
 - Then go to the Case Information Displays option category
 - Change the **Column Headings** to *Use Variable Names*



*Use Normal Headings
or Variable Names*

Option For changing Case Info Display Column Heading to Variables



- You can also change the option in the toolbar



- Choose **Options**> to change heading to show Normal or Variable Names

Use Variable Names



- Provides a graphical way for you to see what the variable names are

	Number	Name	ID	Status	Gen MW	Gen Mvar	Set Volt	AGC	AVR	Min MW	Max MW	Min Mvar	Max Mvar	Cost Model	Part. Factor
1	1	One	1	Closed	101.85	5.25	1.05	YES	YES	100.00	400.00	-9900.00	9900.00	Cubic	1.00
2	2	Two	1	Closed	170.08	33.24	1.04	YES	YES	150.00	500.00	-9900.00	9900.00	Cubic	1.00
3	4	Four	1	Closed	95.03	19.99	1.00	YES	YES	50.00	200.00	-9900.00	9900.00	Cubic	1.00
4	6	Six	1	Closed	200.33	-6.59	1.04	YES	YES	150.00	500.00	-9900.00	9900.00	Cubic	1.00
5	7	Seven	1	Closed	200.65	51.29	1.04	YES	YES	0.00	600.00	-99999.00	99999.00	Cubic	1.00



	BusNum	BusName	GenID	GenStatus	GenMW	GenMVR	GenVoltSet	GenAGCable	GenAVRable	GenMWMin	GenMWMax	GenMVRMin	GenMVRMax	GenCostModel	GenParFac
1	1	One	1	Closed	101.85	5.25	1.05	YES	YES	100.00	400.00	-9900.00	9900.00	Cubic	1.00
2	2	Two	1	Closed	170.08	33.24	1.04	YES	YES	150.00	500.00	-9900.00	9900.00	Cubic	1.00
3	4	Four	1	Closed	95.03	19.99	1.00	YES	YES	50.00	200.00	-9900.00	9900.00	Cubic	1.00
4	6	Six	1	Closed	200.33	-6.59	1.04	YES	YES	150.00	500.00	-9900.00	9900.00	Cubic	1.00
5	7	Seven	1	Closed	200.65	51.29	1.04	YES	YES	0.00	600.00	-99999.00	99999.00	Cubic	1.00

```
DATA (GEN, [BusNum, BusName, GenID, GenStatus, GenMW, GenMVR, GenVoltSet, GenAGCable, GenAVRable,
GenMWMin, GenMWMax, GenMVRMin, GenMVRMax, GenCostModel, GenParFac])
```

```
{
  1 "One      " "1" "Closed"  101.85   5.25   1.05 "YES" "YES"  100.00  400.00 -9900.00  9900.00 "Cubic"  1.00
  2 "Two      " "1" "Closed"  170.08  33.24   1.04 "YES" "YES"  150.00  500.00 -9900.00  9900.00 "Cubic"  1.00
  4 "Four     " "1" "Closed"   95.03  19.99   1.00 "YES" "YES"   50.00  200.00 -9900.00  9900.00 "Cubic"  1.00
  6 "Six      " "1" "Closed"  200.33  -6.59   1.04 "YES" "YES"  150.00  500.00 -9900.00  9900.00 "Cubic"  1.00
  7 "Seven    " "1" "Closed"  200.65  51.29   1.04 "YES" "YES"   0.00  600.00 -99999.00 99999.00 "Cubic"  1.00
}
```

Display Auxiliary Files



- One-line diagram objects can also be saved and edited in the auxiliary file format (*.axd file extension).
- Case Information Displays for one-line diagrams are accessed from **Onelines** → **List Display** → **All Display Objects...**
- Save entire one-line in axd format
 -  **Application Button** → **Save Oneline As...**
 - Choose *Display Auxiliary File (*.axd)* from **Save as type:**
- Open entire one-line in axd format
 -  **Application Button** → **Open Oneline...**
 - Choose *Display Auxiliary File* from **Files of type:**
- **Auxiliary ID** (*SOAuxiliaryID*) field used as an extra key field to uniquely identify objects

Display Objects



Case: Midwest.pwb Status: Initialized | Simulator 13 BETA SCOPF, ATC, PVQV, SimAuto, TS.

Case Information Draw Onlines Tools Options Add Ons Window

Run Mode Edit Mode Onlines Display Options... Contouring... GIS Tools List Display 2D View 100% Dynamic Formatting Toggle Full Screen Custom Hint Values... Keyboard Shortcuts Default Drawing Values... General Options Bus View... Substation View... Open Windows

Midwest

Display Explorer: All Objects

Explore Options

Recent All Objects

Network

- Buses
- DC Transmission Lines
- Generators
- Loads
- Series Capacitors
- Switched Shunts
- Transformers
- Transmission Lines

Aggregations

- Background
- Branch Symbols
- Fields
- Geo Data View
- Other
- Pie Charts
- Text Links

Show Only Objects Selected
How to list grouped objects

Save Complete Display to AXD

Type	X/Longitude Location	Y/Latitude Location	Layer Name	Layer Shown	Selectable In Edit Mode	Use Conditional Zoom	Lc
1 DisplayBus	42.000	89.000	Default Layer	YES	YES	NO	
2 DisplayBusField	47.000	89.822	Default Layer	YES	YES	NO	
3 DisplayBus	26.000	76.000	Default Layer	YES	YES	NO	
4 DisplayBusField	31.000	76.822	Default Layer	YES	YES	NO	
5 DisplayBus	55.000	76.000	Default Layer	YES	YES	NO	
6 DisplayBusField	60.000	76.822	Default Layer	YES	YES	NO	
7 DisplayTransmission	42.000	89.000	Default Layer	YES	YES	NO	
8 DisplayBranchPie	34.750	82.500	Default Layer	YES	YES	NO	
9 DisplayCircuitBreaker	42.000	89.000	Default Layer	YES	YES	NO	
10 DisplayCircuitBreaker	47.000	89.822	Default Layer	YES	YES	NO	
11 DisplayTransmission	26.000	76.000	ayer	YES	YES	NO	
12 DisplayBranchPie	31.000	76.822	ayer	YES	YES	NO	
13 DisplayCircuitBreaker	55.000	76.000	ayer	YES	YES	NO	
14 DisplayCircuitBreaker	60.000	76.822	ayer	YES	YES	NO	
15 DisplayLoad	42.000	89.000	ayer	YES	YES	NO	
16 DisplayLoad	47.000	89.822	ayer	YES	YES	NO	
17 DisplayLoad	26.000	76.000	ayer	YES	YES	NO	
18 DisplayLoadField	31.000	76.822	ayer	YES	YES	NO	
19 DisplayLoadField	55.000	76.000	ayer	YES	YES	NO	
20 DisplayLoadField	60.000	76.822	ayer	YES	YES	NO	
21 DisplayLoadField	42.000	89.000	ayer	YES	YES	NO	
22 DisplayLoadField	47.000	89.822	ayer	YES	YES	NO	
23 DisplayLoadField	26.000	76.000	ayer	YES	YES	NO	
24 DisplayBus	31.000	76.822	ayer	YES	YES	NO	
25 DisplayBusField	55.000	76.000	ayer	YES	YES	NO	
26 DisplayBus	60.000	76.822	ayer	YES	YES	NO	
27 DisplayBusField	42.000	89.000	ayer	YES	YES	NO	
28 DisplayTransmission	47.000	89.822	ayer	YES	YES	NO	
29 DisplayBranchPie	22.375	69.500	Default Layer	YES	YES	NO	
30 DisplayCircuitBreaker	18.375	63.650	Default Layer	YES	YES	NO	
31 DisplayCircuitBreaker	26.375	75.350	Default Layer	YES	YES	NO	
32 DisplayTransmission	55.000	76.000	Default Layer	YES	YES	NO	

Save As
Display Auxiliary File...
Display Auxiliary File (only selected records)...
CSV (Comma delimited)...
CSV (only selected records/columns)...
HTML...
Bitmap...
Jpeg...

Form Control

Search

Edit Mode X = -1.27 Y = 77.12

Example Display Auxiliary DATA Section



- Same format as other auxiliary DATA sections

Object Type for this example is DisplayBus

```
DATA (DISPLAYBUS, [BusNum, SOAuxiliaryID, SOX, SOY, SOThickness, SOColor, SOUseFillColor, SOFillColor,
  SOSize, SOWidth, SOorientation, SOLevel, SOSameLevelDisplayPriority, SOImmobile,
  SLName, SOSStyle, SODashed, SOBbelongsToGroup])
{
  1 "1" 9.00000000 63.00000000 1 0 "YES" 0 6.00 0.45 "Right" "Middle" 132 "NO "
  "Default Layer" "Rectangle" 0 ""
  2 "1" 19.00000000 42.00000000 1 0 "YES" 0 11.00 0.45 "Right" "Middle" 131 "NO "
  "Default Layer" "Rectangle" 0 ""
  3 "1" 37.00000000 63.00000000 1 0 "YES" 0 5.00 0.45 "Right" "Middle" 130 "NO "
  "Default Layer" "Rectangle" 0 ""
  4 "1" 72.00000000 57.00000000 1 0 "YES" 0 9.00 0.45 "Right" "Middle" 129 "NO "
  "Default Layer" "Rectangle" 0 ""
  5 "1" 68.00000000 36.00000000 1 0 "YES" 0 6.00 0.45 "Right" "Middle" 128 "NO "
  "Default Layer" "Rectangle" 0 ""
  6 "1" 15.00000000 15.75000000 1 0 "YES" 0 8.00 0.45 "Right" "Middle" 121 "NO "
  "Default Layer" "Rectangle" 0 ""
  7 "1" 54.00000000 15.75000000 1 0 "YES" 0 11.00 0.45 "Right" "Middle" 119 "NO "
  "Default Layer" "Rectangle" 0 ""
}
```

Case Information Ribbon Tab: Auxiliary File Export Format Descriptions

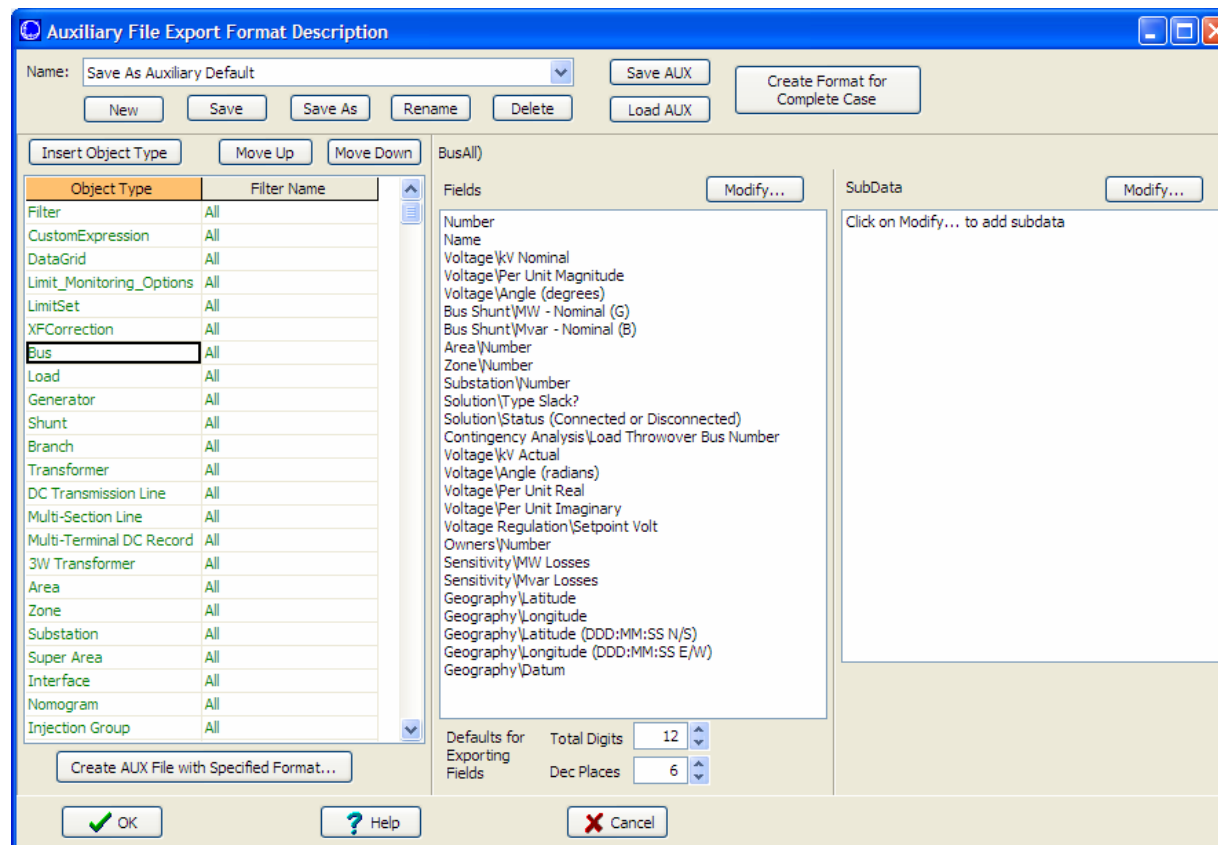


- Allows you to define a list of DATA sections you would like to write out to an Auxiliary File
 - Object Type: Specify type of object
 - Filter Name: All, Selected, AreaZone, or the name of an Advanced Filter in quotes. Allows you to specify which objects to write out data for
 - Fields: a list of all fields to be written for this object
 - SubData: a list of sub-data sections to write for each object
- You can then use a script command to invoke saving all this information
 - `SaveDataUsingExportFormat("filename", filetype, "FormatName");`

Case Information Ribbon Tab: Auxiliary File Export Format Descriptions Dialog



- On the Case Information Ribbon Tab, click AUX Export Format Desc...



Special Object Types to provide better access to SUBDATA objects



- Previously several types of data were only accessible through SUBDATA sections of AUX Files
- This limited your ability to systematically edit/query these objects
 - Could not use Copy/Paste To/From a Spreadsheet
 - Could not use SimAuto commands to access
 - Could not use Script Commands (SaveData, SetData)
- Most of these limitations have now been removed for most object types now
 - New object types have been created that provide access to this data in “sub-tables”
 - [in “database speak” = this is table with a foreign key constraint]

New Object Types created to provide access to SUBDATA



New Object Type Created	Existing Object Type this SUBDATA is related to	Existing SUBDATA Section <SUBDATA XXX>
ReactiveCapability	Gen	ReactiveCapability
PartPoint	InjectionGroup	PartPoint
InterfaceElement	Interface	InterfaceElement
MTDCBus	MTDCRecord	MTDCBus
MTDCConverter	MTDCRecord	MTDCConverter
MTDCTransmissionLine	MTDCRecord	MTDCTransmissionLine
ContingencyElement	Contingency	CTGElement
ViolationCTG	Contingency	LimitViol
CTGElementBlockElement	CTGElementBlock	CTGElement
GlobalContingencyActionsElement	GlobalContingencyActions	CTGElement
PostPowerFlowActionsElement	PostPowerFlowActions	CTGElement

Interface / Interface Element In Auxiliary Files



Interface Objects with <SUBDATA InterfaceElement>

```
DATA (INTERFACE,
      [IntNum,FGName,IntMonDir,
       FGLimA,FGLimA:1,FGLimA:2])
{
1 "East Side" "FROM -> TO" 0.0 0.0 0.0
  <SUBDATA InterfaceElement>
    "BRANCH 4 2 1" NO 0.500000
    "BRANCH 4 3 1" NO 0.600000
    "BRANCH 4 5 1" NO 0.700000
  </SUBDATA>
2 "West Side" "FROM -> TO" 0.0 0.0 0.0
  <SUBDATA InterfaceElement>
    "BRANCH 2 5 1" NO 0.800000
    "BRANCH 2 4 1" NO 0.900000
  </SUBDATA>
}
```

Interface Objects and InterfaceElement Objects

```
DATA (INTERFACE,
      [IntNum,FGName,IntMonDir,
       FGLimA,FGLimA:1,FGLimA:2])
{
1 "East Side" "FROM -> TO" 0.0 0.0 0.0
2 "West Side" "FROM -> TO" 0.0 0.0 0.0
}
DATA (INTERFACEELEMENT,
      [FGName,IntElementDesc:1,
       LineMeter,LPConWeight])
{
"East Side" "BRANCH 4 2 1" "NO" 0.50
"East Side" "BRANCH 4 3 1" "NO" 0.60
"East Side" "BRANCH 4 5 1" "NO" 0.70
"West Side" "BRANCH 2 5 1" "NO" 0.80
"West Side" "BRANCH 2 4 1" "NO" 0.90
}
```

These Auxiliary Files represent EXACTLY the same data

Interface / Interface Element In an Excel Spreadsheet

The screenshot shows a Microsoft Excel spreadsheet with two tables. The first table, 'Interface', is located in rows 2-6 and columns B-G. The second table, 'InterfaceElement', is located in rows 7-13 and columns B-G. The 'Interface' table has columns for Number, Name, Monitor Direction, and three MW columns (Lim A, Lim B, Lim C). The 'InterfaceElement' table has columns for Interface Name, Description (File Format), Metered Far End, and Weighting.

Interface	Number	Name	Monitor Direction	Lim A MW	Lim B MW	Lim C MW
1	1	East Side	FROM -> TO	0	0	0
2	2	West Side	FROM -> TO	0	0	0

InterfaceElement	Interface Name	Description (File Format)	Metered Far End	Weighting
9	East Side	BRANCH 4 2 1	NO	0.5
10	East Side	BRANCH 4 3 1	NO	0.6
11	East Side	BRANCH 4 5 1	NO	0.7
12	West Side	BRANCH 2 5 1	NO	0.8
13	West Side	BRANCH 2 4 1	NO	0.9

Injection Group / PartPoint In Auxiliary Files



Injection Group Objects with <SUBDATA PartPoint>

```
DATA (INJECTIONGROUP, [InjGrpName])
{
  "Big Gens"
    <SUBDATA PartPoint>
      "GEN" 1 "1" 1.0000 "SPECIFIED" "YES"
      "GEN" 2 "1" 1.0000 "SPECIFIED" "YES"
      "GEN" 4 "1" 1.0000 "SPECIFIED" "YES"
    </SUBDATA>
  "Little Gens"
    <SUBDATA PartPoint>
      "GEN" 6 "1" 1.0000 "SPECIFIED" "YES"
      "GEN" 7 "1" 1.0000 "SPECIFIED" "YES"
    </SUBDATA>
}
```

Injection Group Objects and PartPoint Objects

```
DATA (INJECTIONGROUP, [InjGrpName])
{
  "Big Gens"
  "Little Gens"
}

DATA (PARTPOINT,
      [PPntType:1, PPntType, BusNum, PPntID,
       PPntPFInit, PPntParFac, PPntUseFixedParFac])
{
  "Big Gens"      "GEN" 1 "1" "SPECIFIED" 1.00 "YES"
  "Big Gens"      "GEN" 2 "1" "SPECIFIED" 1.00 "YES"
  "Big Gens"      "GEN" 4 "1" "SPECIFIED" 1.00 "YES"
  "Little Gens"   "GEN" 6 "1" "SPECIFIED" 1.00 "YES"
  "Little Gens"   "GEN" 7 "1" "SPECIFIED" 1.00 "YES"
}
```

These Auxiliary Files represent EXACTLY the same data

Injection Group / PartPoint In an Excel Spreadsheet



The screenshot shows a Microsoft Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H
1								
2		InjectionGroup						
3		Name						
4		Big Gens						
5		Little Gens						
6								
7		PartPoint						
8		Contained by	Point Type	Number	ID	Initial Value	ParFac	AutoCalc?
9		Big Gens	GEN		1	SPECIFIED	1	YES
10		Big Gens	GEN		2	SPECIFIED	1	YES
11		Big Gens	GEN		4	SPECIFIED	1	YES
12		Little Gens	GEN		6	SPECIFIED	1	YES
13		Little Gens	GEN		7	SPECIFIED	1	YES
14								

The spreadsheet also shows a navigation pane at the bottom with tabs for 'PartPoint' and 'Participation Groups'.

Contingency / ContingencyElement In Auxiliary Files



Contingency Objects with <SUBDATA CTGElement>

```
DATA (CONTINGENCY, [CTGLabel])
{
"West Outage"
  <SUBDATA CTGElement>
    "BRANCH 2 5 1 OPEN" "" CHECK
    "BRANCH 2 4 1 OPEN" "" CHECK
  </SUBDATA>
"East Outage"
  <SUBDATA CTGElement>
    "GEN 2 MOVE_P_TO 4 50 PERCENT" "" CHECK
    "BRANCH 2 5 1 OPEN" "" CHECK
    "BRANCH 4 5 1 OPEN" "" CHECK
  </SUBDATA>
}
```

Contingency Objects and Contingency Element Objects

```
DATA (CONTINGENCY, [CTGLabel])
{
"West Outage"
"East Outage"
}

DATA (CONTINGENCYELEMENT,
      [CTGLabel,WhoAmI:1,FilterName,ActionStatus])
{
"East Outage" "GEN 2 MOVE_P_TO 4 50 PERCENT" "" "CHECK"
"East Outage" "BRANCH 2 5 1 OPEN" "" "CHECK"
"East Outage" "BRANCH 4 5 1 OPEN" "" "CHECK"
"West Outage" "BRANCH 2 4 1 OPEN" "" "CHECK"
"West Outage" "BRANCH 2 5 1 OPEN" "" "CHECK"
}
```

These Auxiliary Files represent EXACTLY the same data

Contingency / ContingencyElement In an Excel Spreadsheet



The screenshot shows a Microsoft Excel spreadsheet with two tables. The first table, 'Contingency Records', has columns for Label, West Outage, and East Outage. The second table, 'ContingencyElement', has columns for Contingency Label, Actions - PW File Format, Model Criteria, and Status.

Contingency Records		
Label	West Outage	East Outage
ContingencyElement		

Contingency Label	Actions - PW File Format	Model Criteria	Status
East Outage	GEN 2 MOVE_P_TO 4 50 PERCENT		CHECK
East Outage	BRANCH 2 5 1 OPEN		CHECK
East Outage	BRANCH 4 5 1 OPEN		CHECK
West Outage	BRANCH 2 4 1 OPEN		CHECK
West Outage	BRANCH 2 5 1 OPEN		CHECK

Special support Sub-Types of these New Object Types



- These special object types give you access to a combination of all the “sub-object” fields and specific device fields simultaneously

New Object Type	PartPoint	InterfaceElement
Special Sub-Types which provide access to two tables simultaneously	PartPointGen PartPointInjectionGroup PartPointLoad PartPointShunt	InterfaceElementBranch InterfaceElementBranchClose InterfaceElementBranchOpen InterfaceElementDCLine InterfaceElementGen InterfaceElementInjectionGroup InterfaceElementInterface InterfaceElementLoad InterfaceElementMSLine

Example: Special support Sub-Types of these New Object Types



- PartPointGen
 - Provides access to all PartPoints that represent generator objects
 - Provides access to BOTH the list of fields for the PartPoint AND the Gen
- InterfaceElementBranch
 - Provides access to all InterfaceElements that represent branch objects
 - Provides access to BOTH the list of fields for the InterfaceElement AND the Branch