

The Power of Auxiliary Files

2006 PowerWorld Client Conference

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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



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What Can You DO with Auxiliary Files?

- Quality Assurance: Standardize settings and controls for multiple cases and studies
- Customize Simulator environment
- Document
 - Describe an analysis procedure for a manager or client
 - Create a detailed project record
 - Enable reproducibility
- Automate detailed calculations and storage of the results
- Automate building and editing of a one-line diagram

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Standardize Settings



- Solution Options
- Limit Monitoring
- Contingency Options
- Default Drawing Values for One-lines
- ATC, OPF, PVQV Options
- Many more

Standardize Settings: Example



- Set power flow solution options
- Set Limit Monitoring
- Set OPF options
- Load generator information
- Set AGC to NO for all Hydro, Wind, and Unknown units
- Sample file series aux10?0*.aux

Master File



```
SCRIPT
{
// Custom filters and expressions (used in AGC actions below)
LoadAux("aux1010FiltersExpressions.aux", Yes);

// Power Flow Solution Options
LoadAux("aux1020SolutionOptions.aux", Yes);

// Limit Monitoring Settings
LoadAux("aux1030LimitMonitoring.aux", Yes);

// OPF Options
LoadAux("aux1040OPFOptions.aux", Yes);

// Contingency options and files
// LoadAux("aux1050Contingencies.aux", Yes); // COMMENT out if not needed for this project

// Generator Cost Files
LoadAux("aux1060GeneratorCostModels.aux", Yes);

// Generator AGC Settings
LoadAux("aux1070GeneratorAGC.aux", Yes);
}
```

Standardize Settings: Tips



- Use a master file to call secondary files (LoadAux)
 - Overall procedure can be maintained in the master file
 - Parameters subject to change over time (e.g. generator cost curves) can be stored in the secondary files
 - Can suppress confirmation dialogs when creating new objects

Standardize Settings: Tips



- Use script actions to select all, change selected, then unselect all
 - Objects that need to be handled specially (e.g. study areas) can be identified by primary key or filter in specific statements
 - Improves compatibility with different cases having different objects and topology
- “Selected” field
 - Available for every object
 - Value is not saved with the case and always set to NO when case is opened

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Standardize Settings: Tips



- Build files by saving case info displays and settings to auxiliary files
 - Use text editor to review, make changes, and add comments
 - Can append new DATA sections to existing auxiliary files
- DATA sections: save only key fields and the records and columns necessary to make needed changes
 - Example: if setting generator AGC status is the objective, do not include other fields such as Gen MW, Gen Max MW, etc.
 - Extra fields may be specific to one case and not appropriate for other cases
- Use comments to document

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Customize Environment: Example

- Automatically load aux file each time a case is loaded
- Use to customize
 - Area/Zone/Owner Filters
 - Advanced Filters
 - Custom Expressions
 - Custom Data Grids
 - Many more
- Sample file series aux30?0*.aux

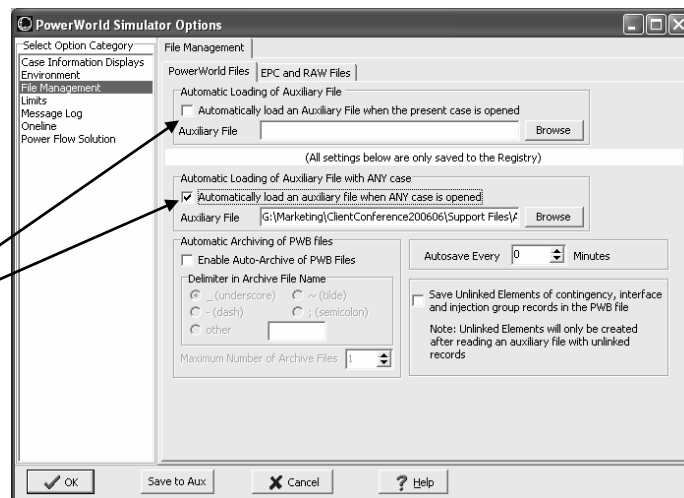
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Automatically Load File

Load a file for
PRESENT case
or ANY case



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Document and Automate: Example

- Generation interconnection study
 - Add new generator and some transmission to case
 - Displace power across control area
 - Run ATC and save results
- Auxiliary files automate and document entire procedure
- Sample file series aux20?0*.aux: use with B7FLAT.pwb

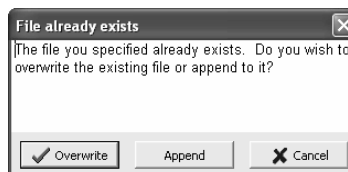
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Tip: Use Difference Cases

- Reveal topology changes in cases
- Save new items (“Only Elements Added”) to auxiliary file
- Save removed items (“Only Elements Removed”) items: append to the same auxiliary file if desired

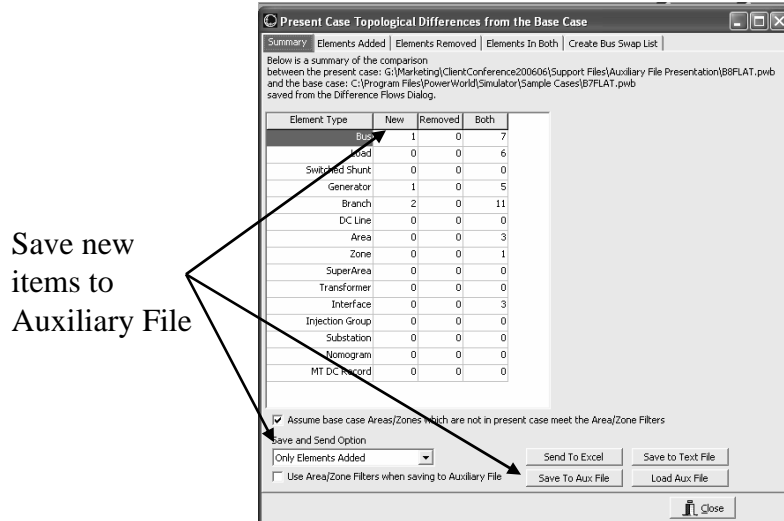


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Difference Cases



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One-line Diagrams

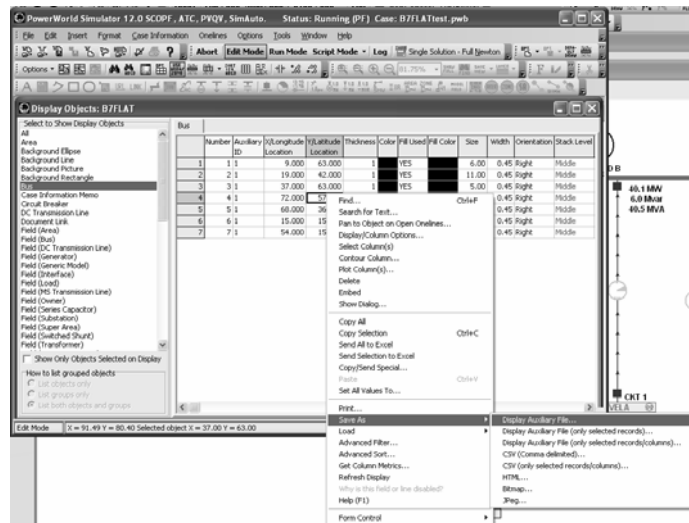
- New Display Auxiliary File (*.axd) format extends the power of Auxiliary Files to one-line diagrams
- Enables automated generation of one-line diagrams from an external scripting process
- Case Information Displays for one-line diagrams are accessed from **Onelines** → **All Display Objects...**
- Sample file
 - aux2020Online.axd
 - updates B7FLAT.pwd for the previous generator interconnection example

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Display Objects



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More Information

- More sample files are located at <http://www.powerworld.com/support/auxfiles.asp>

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