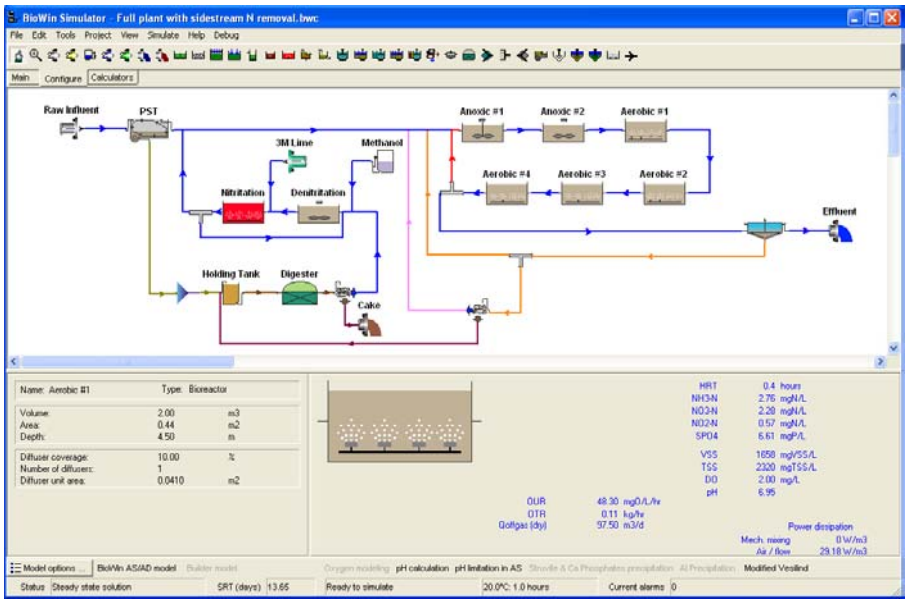
# Quick Feature Tour

## Quick Feature Tour Overview

This chapter highlights some of the features available in the latest version of BioWin. These are demonstrated using the "An Example" configuration installed in the **Data** directory. The purpose of this chapter is to provide a brief introduction.

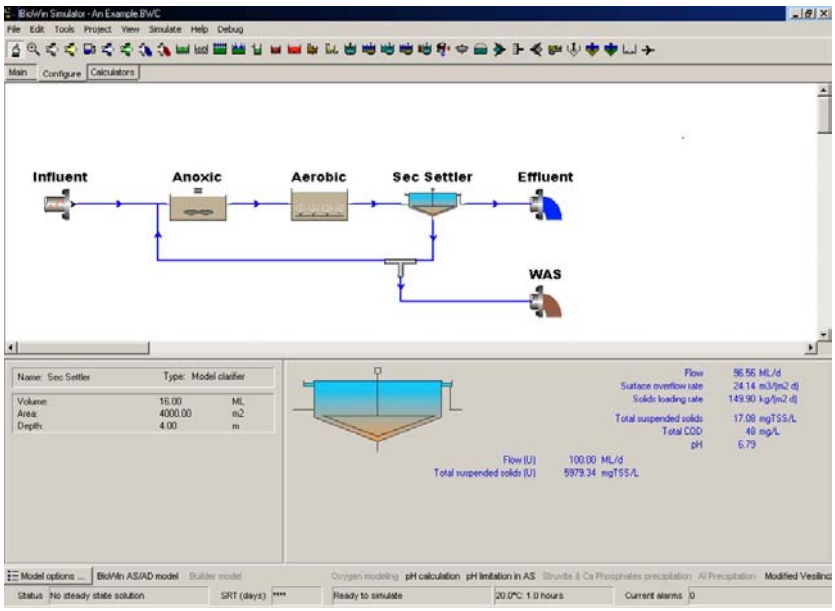
For specific examples on using BioWin, please see "*BioWin Tutorials*". You can find more BioWin examples as follows:

- Select **File|Open** and browse to the **Examples** directory. These systems are discussed in the Help section on BioWin Tutorials and Examples.
- On the BioWin main window toolbar, at the end on the right, click on the arrow next to the icon that looks like a filing cabinet. This brings down a list of pre-configured BioWin process files for a range of system configurations.



# The Interface

The example system shown below is a simple two-reactor activated sludge configuration.




*A simple two-reactor activated sludge configuration*

The BioWin main simulator window interface consists of:

- Menus
- Toolbars
- Drawing Board
- Summary Panes
- Status Bar

Setting up such a system is easy to do – it's a matter of minutes. Buttons on the toolbar at the top of the main simulator window represent the various unit processes available in BioWin. Simply click on a button, move your mouse cursor over the area on the drawing board where you want to place an element, and click the mouse button.

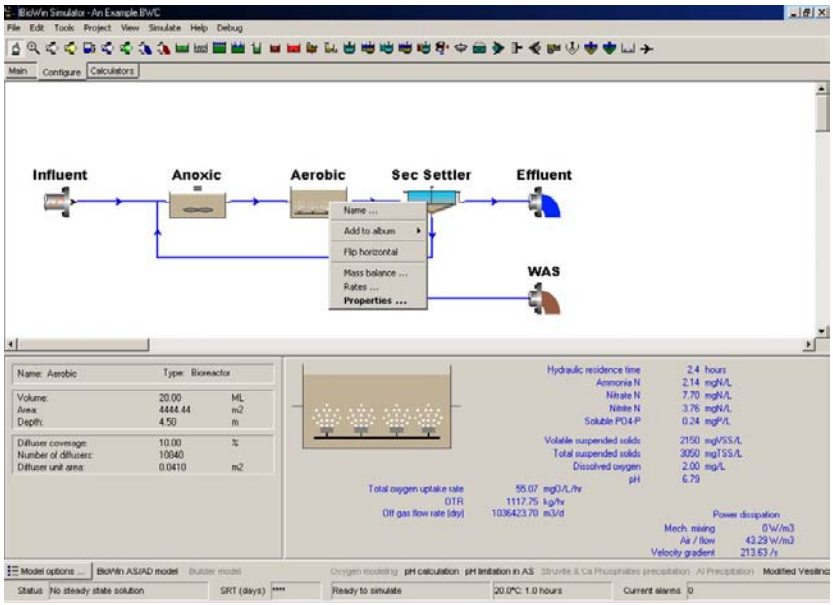
Most types of wastewater treatment systems can be configured in BioWin using the many process modules. These include:

- A range of activated sludge bioreactor modules – suspended growth reactors (diffused air or surface aeration), various SBRs, media reactors for IFAS and MBBR systems, variable volume reactors.
- Anaerobic and aerobic digesters.
- Various settling tank modules – primary, ideal and 1-D model settlers.
- Different input elements – wastewater influent (COD- or BOD-based), user-defined (state variable concentrations), metal addition for chemical phosphorus precipitation (ferric or alum), methanol for denitrification.

- Other process modules – holding tanks, equalization tanks, dewatering units, flow splitters and combiners.

**Note:** A new Sidestream Reactor element can be included in configurations. This is mainly for convenience as it is easily distinguished from other activated sludge reactors on the drawing board. The model applied in a sidestream reactor is no different from the model used in other units. BioWin is based on a single integrated model for all biological and chemical reactions, and the same model is applied to any unit in a BioWin simulation. The only difference for a Sidestream Reactor is that the "seed" values selected by BioWin when a simulation starts differ from those for a standard activated sludge bioreactor.

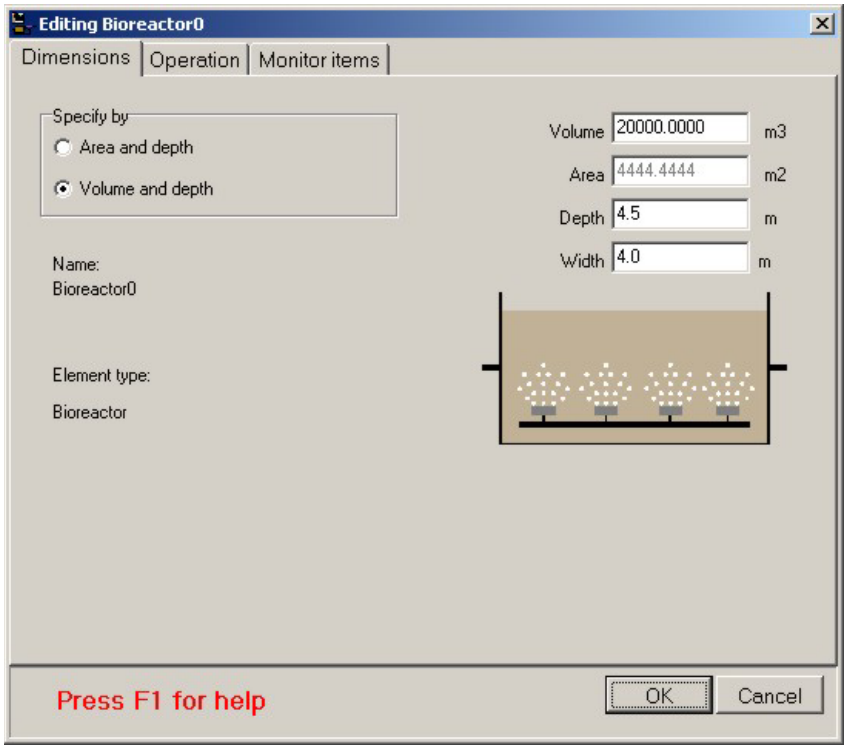
A quick way to gain access to local menus which contain commands specific to a particular object is through the use of the right mouse button. For example, if you point to the influent element and right-click, you will get a local menu as shown below.




*Using the right mouse button gives access to local menus*

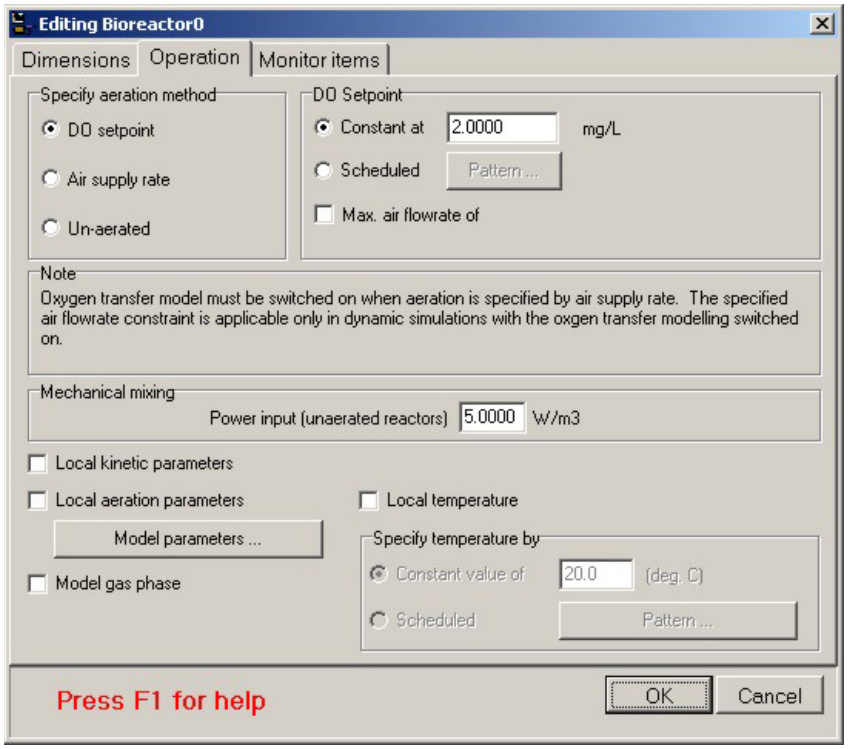
# Element Information

Double-clicking on a drawing board icon for an element in a configuration gives access to all pertinent information for that element. For example, double-clicking on a bioreactor element allows access to physical and operational data, as well as the facility to set up data monitoring.




*Dialog box allows access to all bioreactor information*

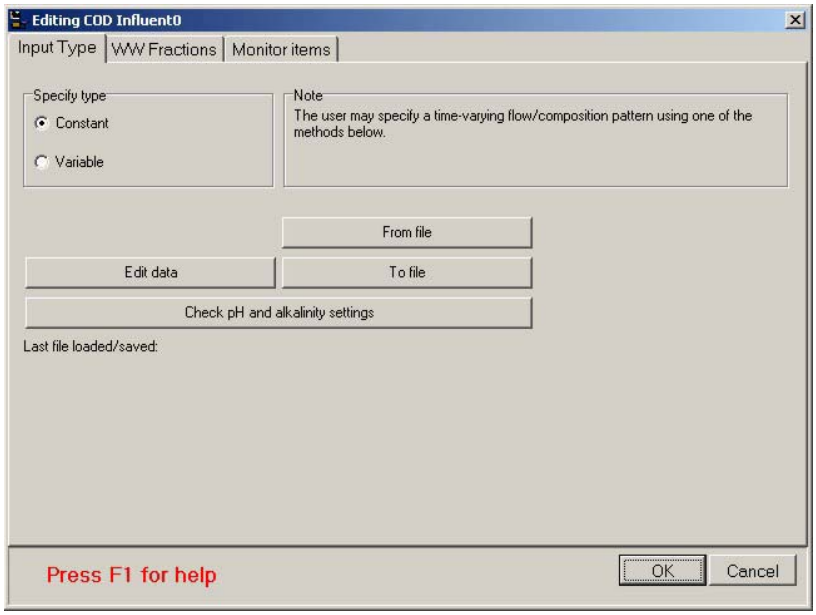
Once you've double-clicked on an element icon to gain access to this information, it's just a matter of clicking on the tab you are interested in. For example, clicking on the **Operation** tab will allow you to change the bioreactor operating parameters shown below.



*The bioreactor operation tab*

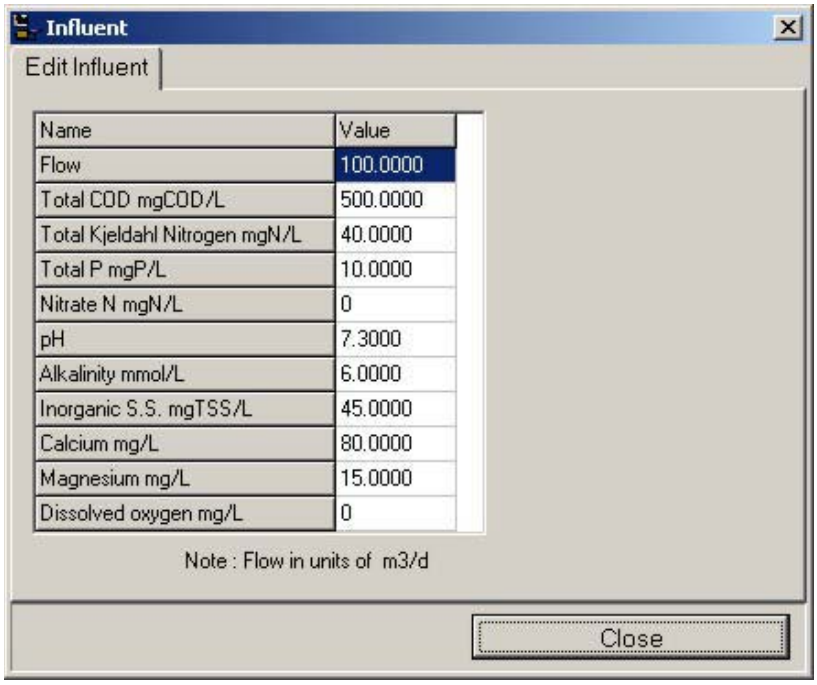
# Influent Data

Setting up influent data is a quick and easy process. If you double-click on an influent element drawing board icon, you will see the following dialog box.




*Access the influent properties to set up influent data*

Clicking the **Edit data** button as shown will open the **Influent itinerary editor**, as shown below.




*The variable influent itinerary editor*

The **Influent itinerary editor** provides a spreadsheet-like interface for entering data. BioWin even offers several different strategies for filling in blanks in your data! It is very easy to import data into the itinerary editor from files or to copy it in from a spreadsheet – in fact, the data in the example shown above were pasted in from Microsoft Excel™!

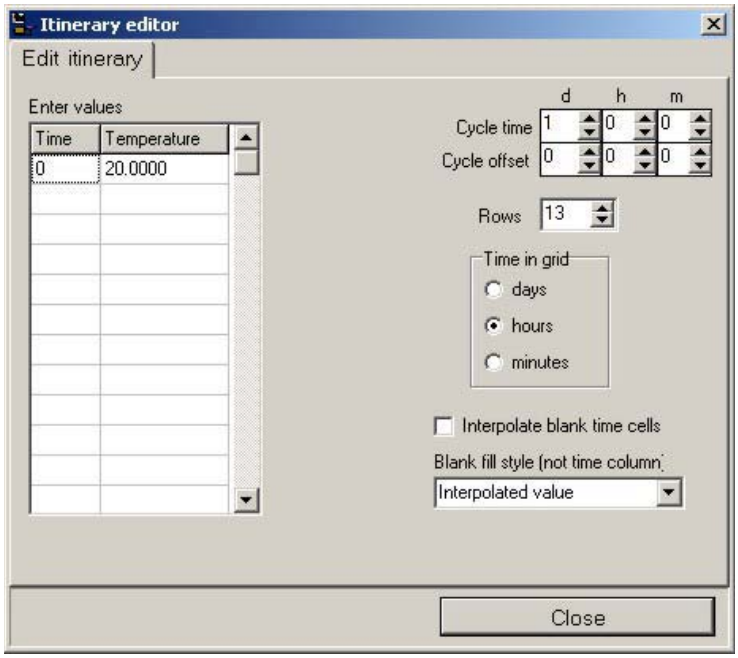
# Running A Simulation

*Steady state balance tool*

*Dynamic simulation tool*

Steady state and dynamic simulations are run from the main simulator window. Once you have taken a few minutes to specify information for the various elements in your configuration, commencing a simulation is simply a matter of clicking the appropriate button on the toolbar!

BioWin uses a powerful itinerary that allows the user to schedule many different operating conditions such as dissolved oxygen setpoints, air flowrates, and temperature. For example, suppose that you were simulating varying temperature conditions. With BioWin, you easily can set up a temperature schedule using the dialog box shown below.




*Scheduling operating conditions is not a problem!*

# Help and Manual

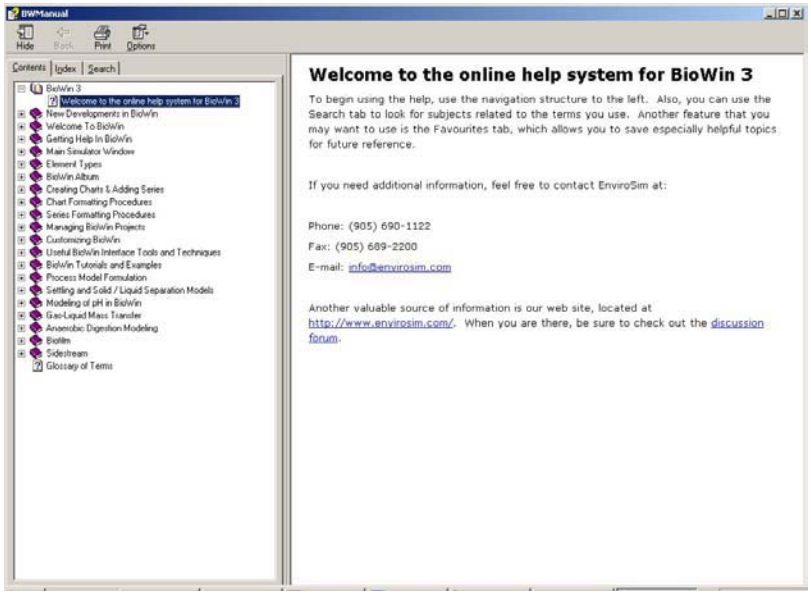
BioWin comes with an extensive manual which is shipped as a series of Microsoft Word™ documents each consisting of a chapter so you can easily print out the sections of specific interest.

*Help Contents & Index*

*Help on using help*

You may find this unnecessary as the contents of this manual are available via BioWin's online help. You can access this help system via the toolbar help buttons. Another useful feature that makes BioWin easy to learn is context-sensitive help. To get help that is relevant to a particular dialog box you are working in, simply hit the **F1** key and BioWin will access related topics from the help system and display them to you.

A screen shot of the help system is shown below.




*A BioWin help window (Contents tab showing)*

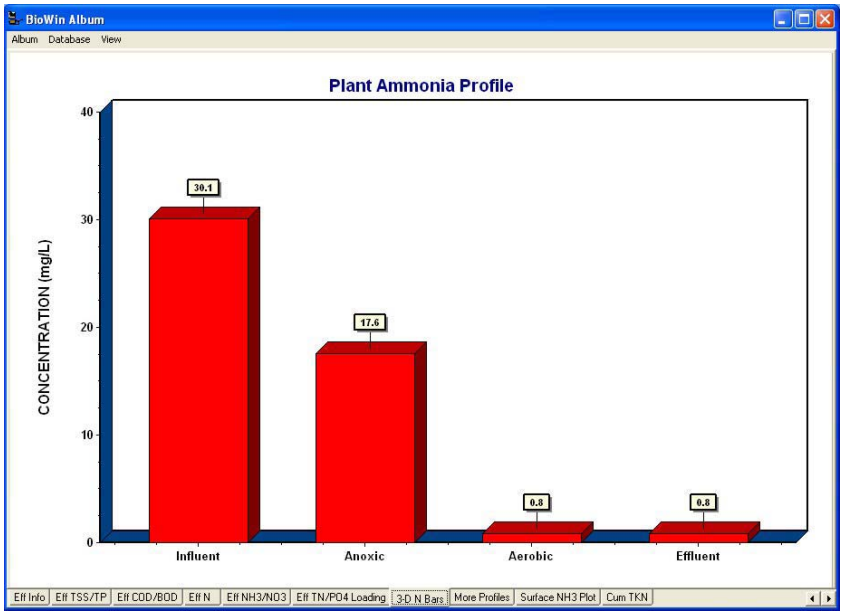
# Viewing Simulation Results

The BioWin Album provides a fully integrated means to display simulation results. Using the album you can view data in the following formats:

- Tables
- Element-specific information displays
- Charts

 *Opens the album*

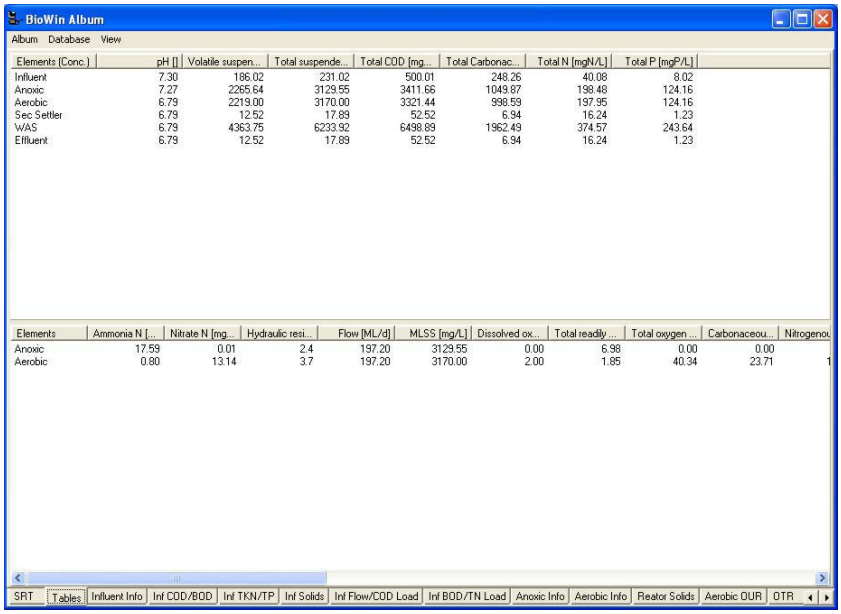
Activating the album is as simple as clicking the appropriate button on the main window toolbar. The album consists of a series of tabbed pages which may contain any or a combination of the above data display formats. Shown below is the album with the active page displaying a chart.




*The album interface*

## Tables

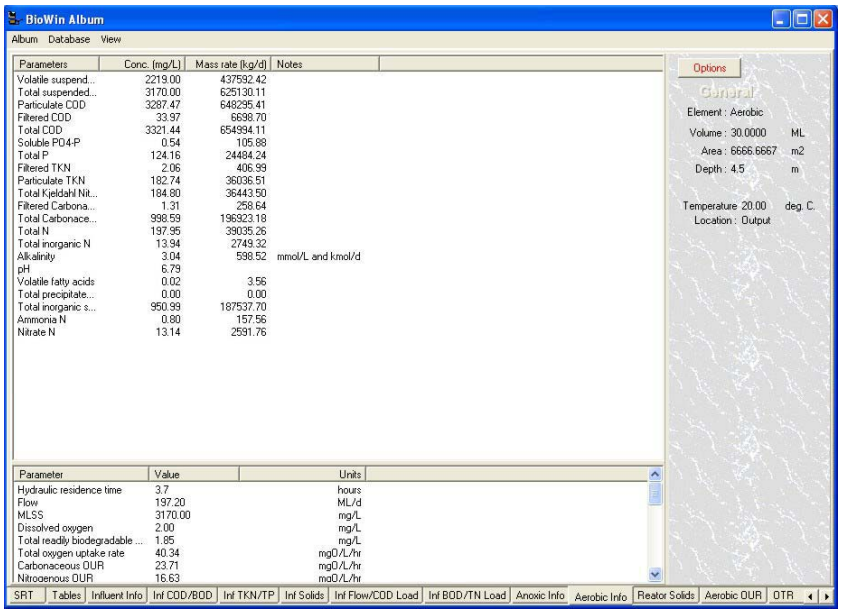
Here is an example of an album page containing two tables.



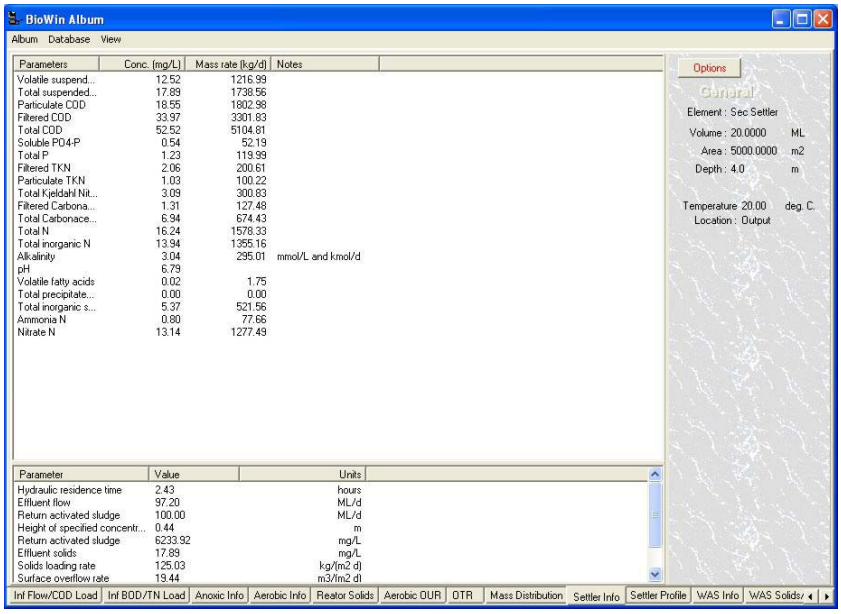

*An album page containing two tables*

## Element-Specific Information

Here are two examples of element-specific information displays; one for a bioreactor element and one for a settling tank element.



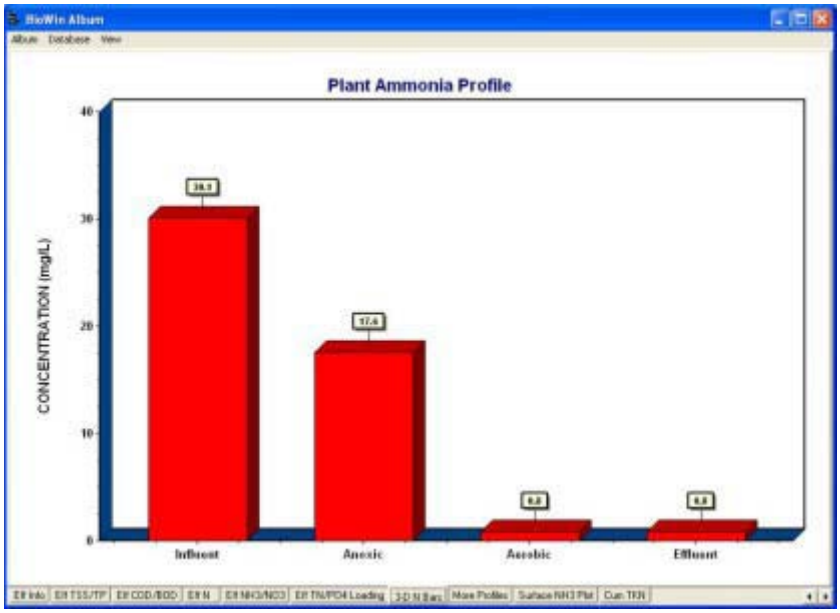

*A bioreactor element-specific information display*



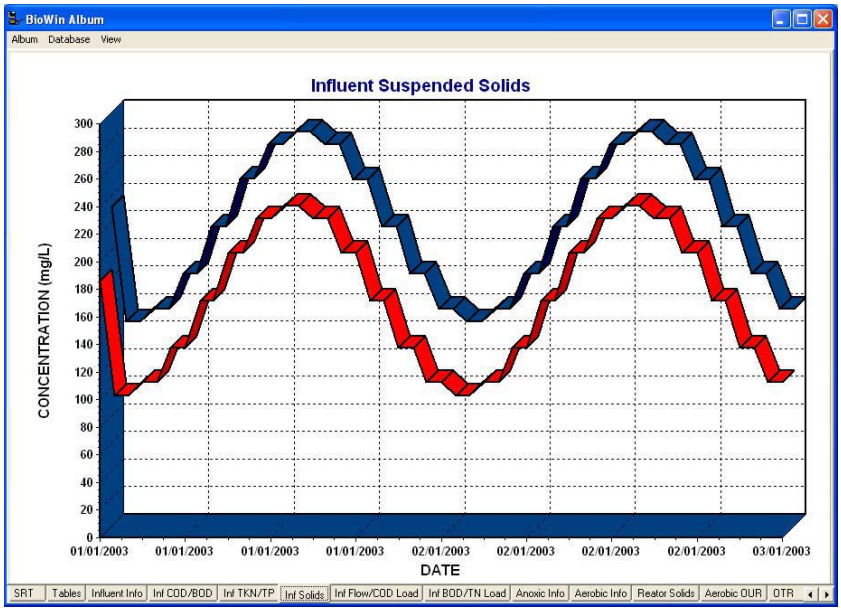

*A settling tank element-specific information display*

## Charts

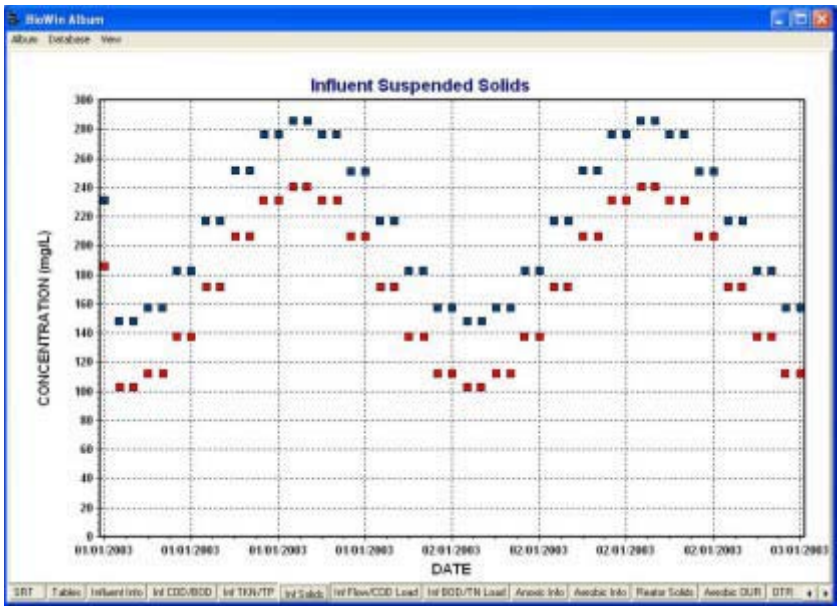
BioWin offers a wide variety of charting options. Here are some examples.



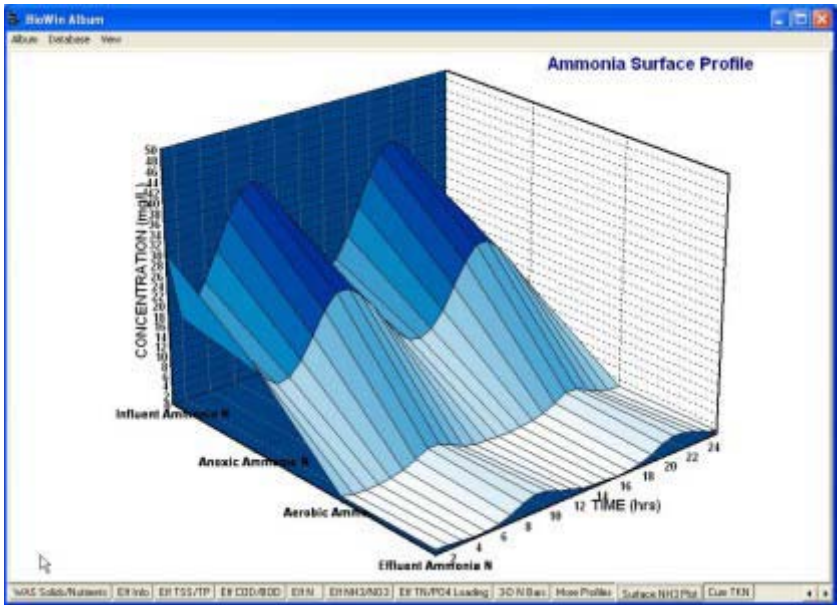

*A bar chart*



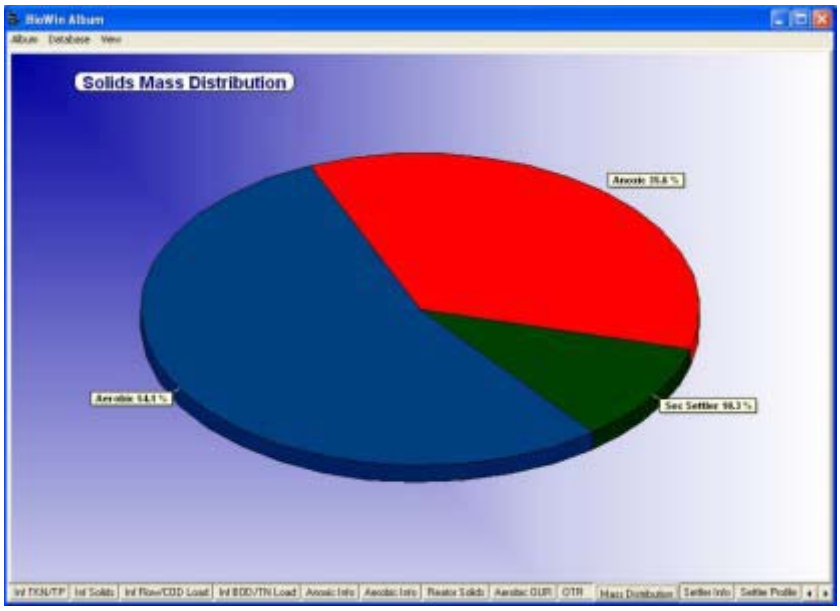

*A three-dimensional line plot*



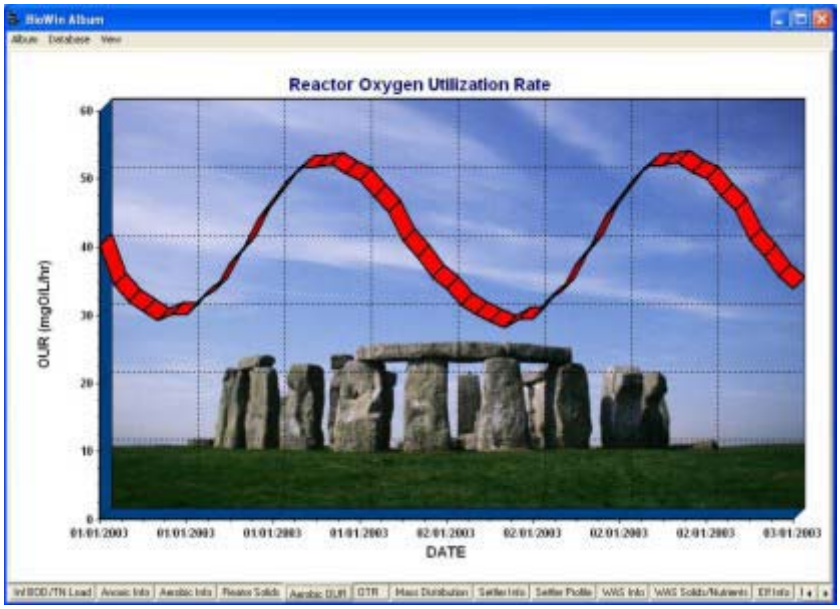

*A two-dimensional point plot*




*A surface plot*




*A pie chart*




*Place pictures (or your company's logo!) in the chart background for presentations*

# Creating Reports

## Printing Reports

BioWin incorporates a powerful automatic report generation feature. With a single click, BioWin can generate a detailed printed report.

## Customizing Reports

The type of information that appears in the report is completely customizable. The general information that can be included in a report may be:

- Project information (user name, plant name, project name, etc.);
- A picture of the project flowsheet;
- Global model parameter values;
- Global temperature setting;
- Album pages (charts, tables, etc.);
- The SRT for the system (if one is available);
- Any notes that have been entered in the BioWin Notes editor;

The reporting can be customized to include element-specific information on an element-type basis. Users can choose whether or not they want to include information for element types (e.g. Bioreactor) in the report. The type of information included in the report for each type of element can be different and may include:

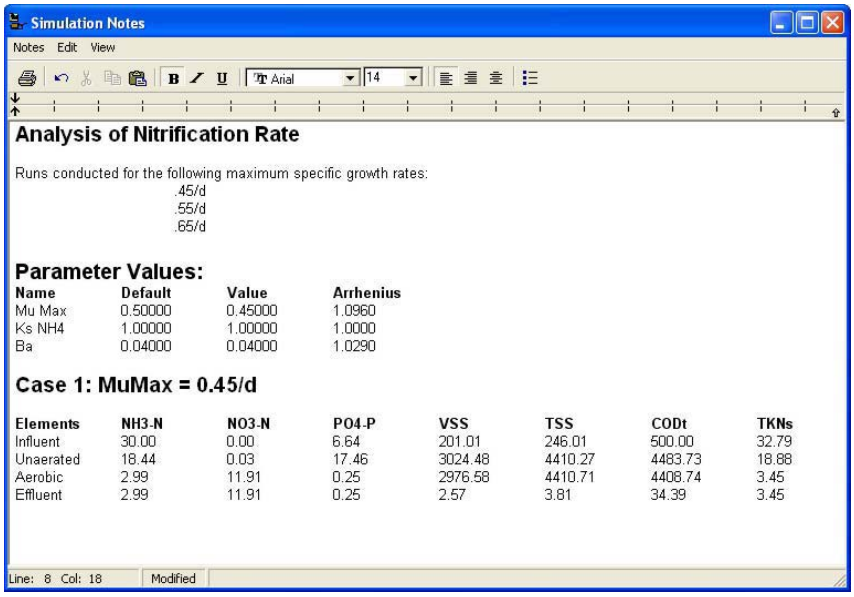
- Physical data (volume, area, depth, # of diffusers, etc.);
- Operating data (average or flow-weighted average);
- Local settling parameters (if available);
- Local biological model parameters (if available);
- Aeration parameters (if available);

## Generating Reports in Microsoft Word™

If you prefer an electronic version, BioWin also can generate your report as a Microsoft Word™ document. Like the printed report, the information contained in the electronic version is completely customizable and may include many different forms. Once BioWin has generated the document for you, you may use it as a basis for an engineering report, or cut and paste its contents into another document.

Related functionality includes the ability to print out all or ranges of the album pages. You can also set the number of album pages per printed page.

Additionally, BioWin has its own internal **Notes** editor (shown below) to help keep track of project details.




*BioWin's internal simulation notes editor*

## Exporting Results to a Word Processor or Spreadsheet

It also is very easy to get results from BioWin into your word processor or spreadsheet. Charts, tables, system configuration layouts, etc. can be copied and pasted from BioWin to your reports. Tables can be exported as tabbed text and then quickly converted to tables, such as the one below which is a section of a Word™ document.

**Table 1**

| Elements | pH [] | Volatile suspended solids [mgVSS/L] | Total suspended solids [mgTSS/L] | Total COD [mg/L] | Total Carbonaceous BOD [mg/L] | Total N [mgN/L] | Total P [mgP/L] |
|---|---|---|---|---|---|---|---|
| Influent | 7.30 | 186.02 | 231.02 | 500.01 | 248.26 | 40.08 | 8.02 |
| Anoxic | 7.27 | 2265.64 | 3129.55 | 3411.66 | 1049.87 | 198.48 | 124.16 |
| Aerobic | 6.79 | 2219.00 | 3170.00 | 3321.44 | 998.59 | 197.95 | 124.16 |
| Sec Settler | 6.79 | 12.52 | 17.89 | 52.52 | 6.94 | 16.24 | 1.23 |
| WAS | 6.79 | 4363.75 | 6233.92 | 6498.89 | 1962.49 | 374.57 | 243.64 |
| Effluent | 6.79 | 12.52 | 17.89 | 52.52 | 6.94 | 16.24 | 1.23 |

*A BioWin table exported to a word processing application*

# Customizing

There are a variety of features that can be customized in BioWin. These are outlined briefly below.

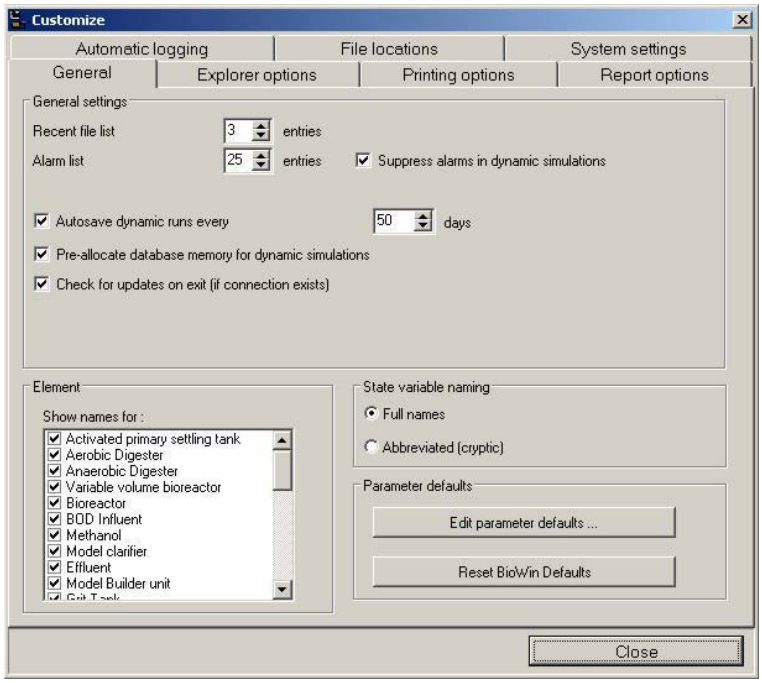
## Customizing Environment Settings

BioWin offers users the ability to customize a number of environment settings to suit their needs. For example, some of the customizable features include:

- Printing options

- Report Options
- Automatic Logging
- File Locations
- Explorer Options
- System Settings

Access to the customizable features is managed through a central location, shown below.



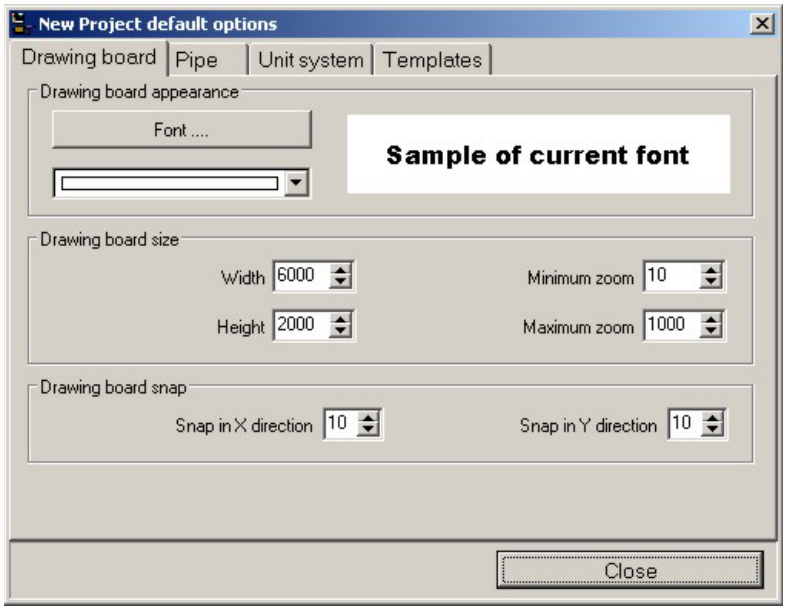

*All customizable environment settings accessed through one dialog box*

## Customizing Project Settings

BioWin offers users the ability to customize a number of new project settings to suit their needs. For example, some of the customizable features include:

- Drawing board appearance
- Pipe Settings
- Unit System Settings
- Template Settings for the Album

Access to the customizable features is managed through a central location, shown below.




*All customizable new project settings accessed through one dialog box*

## Customizing Charts

Finally, you can customize how BioWin generates new charts using the **Chart Master** and chart templates as shown below.

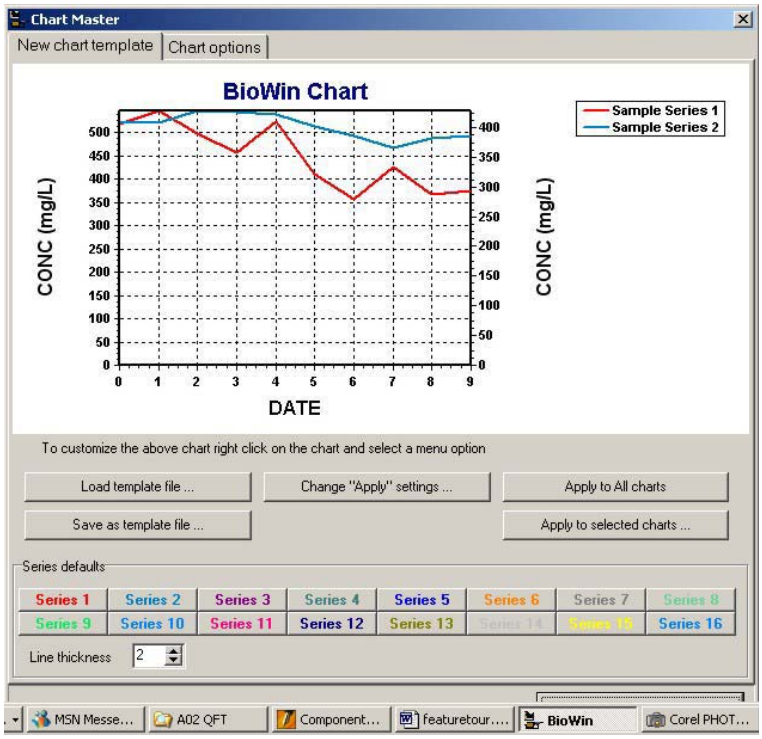


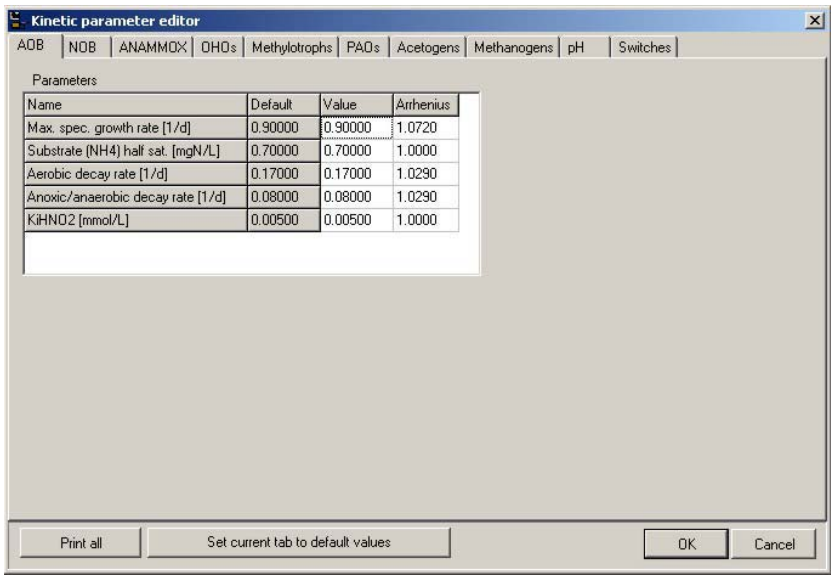

*Chart Master*

# Model Information

BioWin is not only a slick simulator package. The user has ready access to detailed model features for the many operations. Model parameters may be accessed conveniently from a single **Model parameter editor**, shown below.

BioWin offers many utilities to facilitate process analysis. These include:

- Adjusting kinetic parameters and temperature in individual units;
- Simulation of biological activity in secondary clarifiers;
- Scheduling of many different operating parameters such as temperature, dissolved oxygen setpoint, air flowrate, and flow routing/splitting.




*Model parameters may be changed through a single editor*

# Getting Help In BioWin

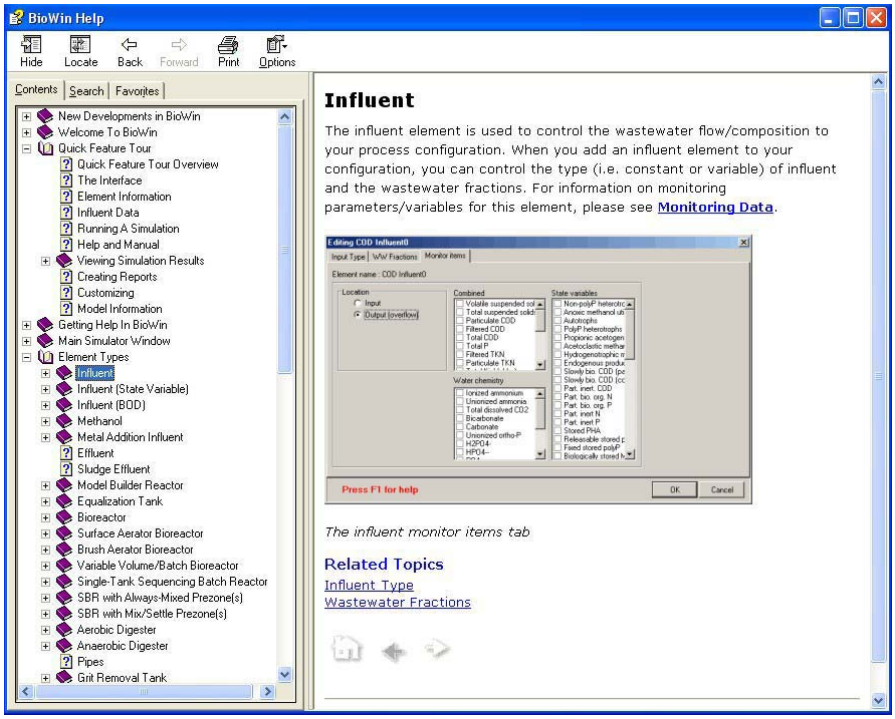
## Using The BioWin Help System

BioWin's help system may be accessed with one of two methods:

1. The main simulator window menu command **Help|Contents and index**;
2. Clicking the **Help Contents and Index** button on the main toolbar of the main simulator window.

*Help Contents & Index*

When the help system is opened, you will see a two-paned window with the right pane showing the contents of the currently selected topic (or a default start topic if one is not selected) and the left pane showing the **Contents**, **Search,** and **Favorites** tab, depending on which tab was active when the help system was last exited. Note that the relative size of the panes can be changed by dragging the pane dividing bar. The two-paned window is shown below.




*The Windows 98/HTML Help two-paned window*

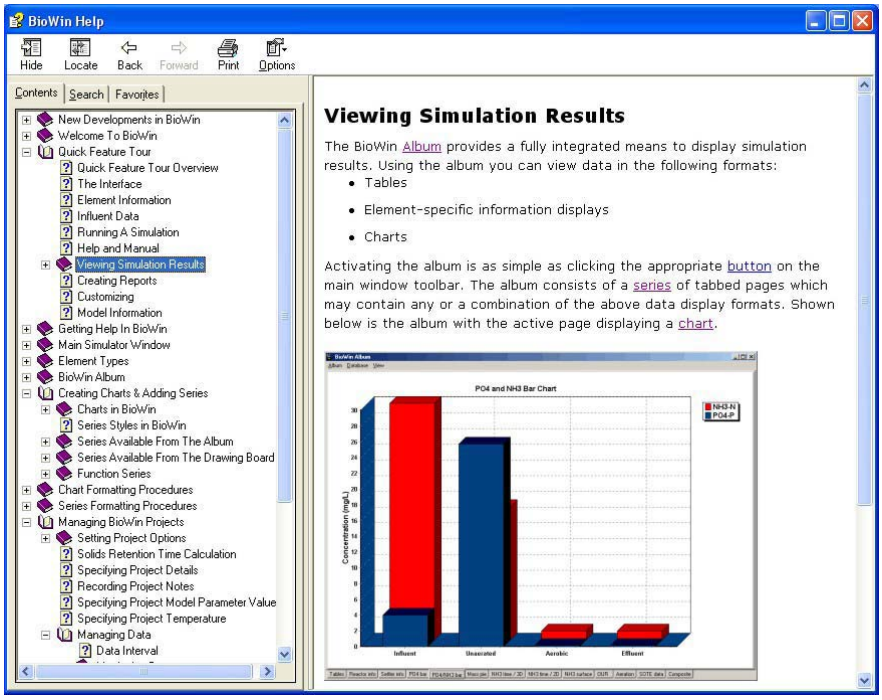
The buttons at the top of the two paned window have the following functions:

| Button | Function |
|---|---|
| Hide / Show | Used to toggle the left pane between hidden and visible states. |
| Locate | Clicking this button will display the contents tab in the left pane and highlight the topic that you currently are viewing. This button is useful for locating related topics when using the Index or Search tab. |
| Back | Moves one topic back in your *browse history*. Takes you to the last topic that you viewed. |
| Forward | Moves one topic forward in your *browse history*. Takes you to the previous topic you viewed. |
| Print | A dialog box opens that allows you to choose whether you want the current topic or the current topic and all its sub-topics to be printed. |
| Options | Sets display options for your help system – it is recommended that these options be left set to their defaults. |

Note that at the bottom of each topic there are two arrows. These are the **Browse Sequence** arrows, which may be used to move through the help system topic hierarchy one topic at a time.

## Help Contents Tab

One advantage of the BioWin help is that when the **Contents** tab is selected, it is possible to view topics and the help system outline structure simultaneously, as shown in the picture below.

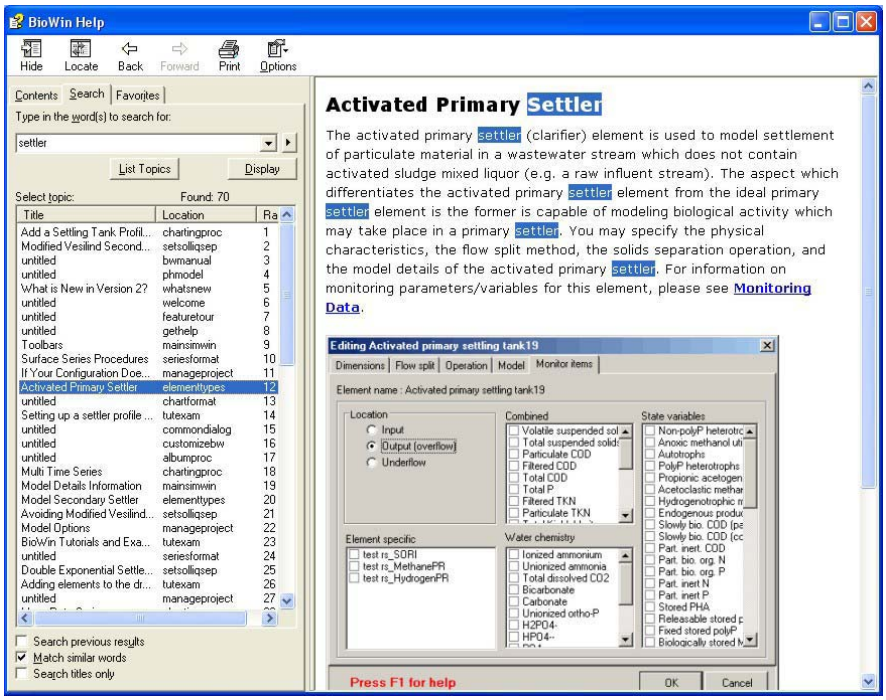



*The Help Contents Tab*

You can expand and collapse levels of the help system outline by clicking on the book icons or titles of the levels. If there is text associated with a level, it will be displayed in the right pane. When you locate the topic you wish to view, click on it and the topic contents will be displayed in the right pane.

## Help Search Tab

When the Windows 98/HTML style help **Search** tab is selected, it is possible to view your search results and topics simultaneously, as shown in the picture below.




*The Help Search tab*

To use the search utility, type in the keyword(s) or phrase that you are searching for, and click the **List Topics** button. This will display the list of topics containing the keyword(s) or phrase that you searched for. To view a topic, you can either double-click on the topic title or click topic title and then click the **Display** button, and the topic contents with your search term(s) highlighted will be displayed in the right pane.

## Help Favorites Tab

Another feature of the BioWin help is the **Favorites** tab, shown below.