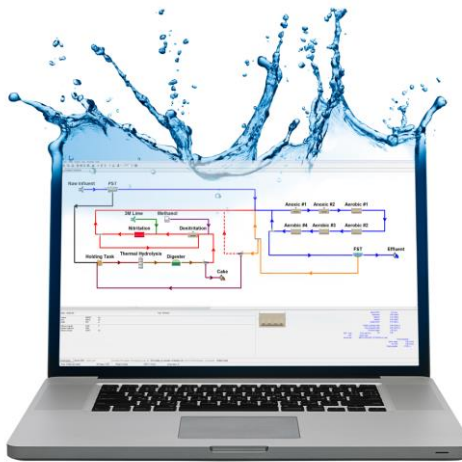


What's New in BioWin 6.0



EnviroSim
ASSOCIATES LTD.

Introduction

- **This document provides a quick overview of new features in BioWin 6.0**
- **Two main areas:**
 1. Model Additions
 2. Usability Upgrades


▪ **Model Additions**

- Chemical Phosphorus Removal
- Sulfur (Biological, RedOx, etc.)
- Industrial Organics
- CEPT
- Iron RedOx
- P Recovery (Brushite, Vivianite)
- Cellulose
- Source Separated Organics

▪ **Usability Upgrades**

- Drawing Tools / Undo
- Excel Reporting
- Variable Naming / Sorting
- Element Tags
- Table Transposition
- Optional Alarms
- More Example Flowsheet Templates
- Set All Parameters Default
- Metal Salt Sol'n Densities
- m³/hr Flow Units Option
- Wet Tonne Sludge Cost Option

Introduction

- **For more details on topics, references to relevant sections of the BioWin Help Manual are provided**
- **The BioWin Manual is provided in two forms:**
 1. As a PDF (default install location is C:\Program Files(x86)\EnviroSim\BioWin 6.0\Manuals)
 2. In “Windows Help” format from within BioWin
- **To Use PDF**
 - Open it from directory above
 - Or copy it to any other location of your choice (*e.g.* Desktop, My Documents)
- **To Use Windows Help**
 - Select Help > Contents & Index
 - Click Help button 
 - Press F1 key on your keyboard (context-sensitive method; will open a relevant topic in the manual)

Introduction

■ Example Manual reference:

Model Reference > Chemical Precipitation Reactions > Chemical Phosphorus Removal with Iron Salts

Chemical Phosphorus Removal with Iron Salts

The following figure illustrates the processes involved in chemical phosphorus removal with iron salts.

Legend:

- Green arrow: Precipitation
- Cyan arrow: Aging
- Red arrow: Adsorption
- Purple arrow: Co-precipitation
- Blue arrow: Oxidation

Schematic representation of the ferric precipitation model in BioWin

When the model option **Include ferric – phosphate adsorption/precipitation reactions** is selected addition of ferric to water results in the rapid precipitation of hydrous ferric oxides (HFO) with a high number of active surface sites, **HFO - High surface**. When the model options **Include ferric – phosphate adsorption/precipitation reactions AND Include iron reduction/oxidation reactions** are selected, addition of ferrous to an oxidizing environment can result in the oxidation of ferrous to **HFO - High surface**. **HFO - High surface** will either age to **HFO - Low surface** or adsorb/co-precipitate with $H_2PO_4^-$, H^+ , or colloidal **COO** (X_{sc}). The fate of **HFO - High surface** depends on the mixing intensity, the pH, and whether the model option **Include metal salt – colloidal material coagulation reactions** is selected. (See [Factors Impacting HFO Interactions](#)).

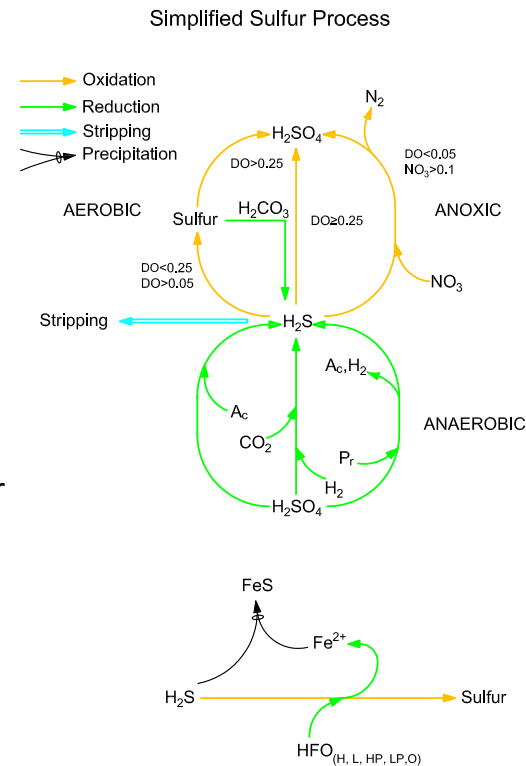
Depending on the pH, $H_2PO_4^-$ can co-precipitate with **HMO - High surface** to form **HFO - High surface with $H_2PO_4^-$** .

Model Addition - Sulfur

- Extension of what has been in PetWin for several years
 - Sulfide-oxidizing bacteria
 - Sulfate-reducing bacteria (multiple types)
 - Potential hydrogen sulfide stripping
 - Iron-sulfide (FeS) precipitation
 - Model iron addition for H₂S control

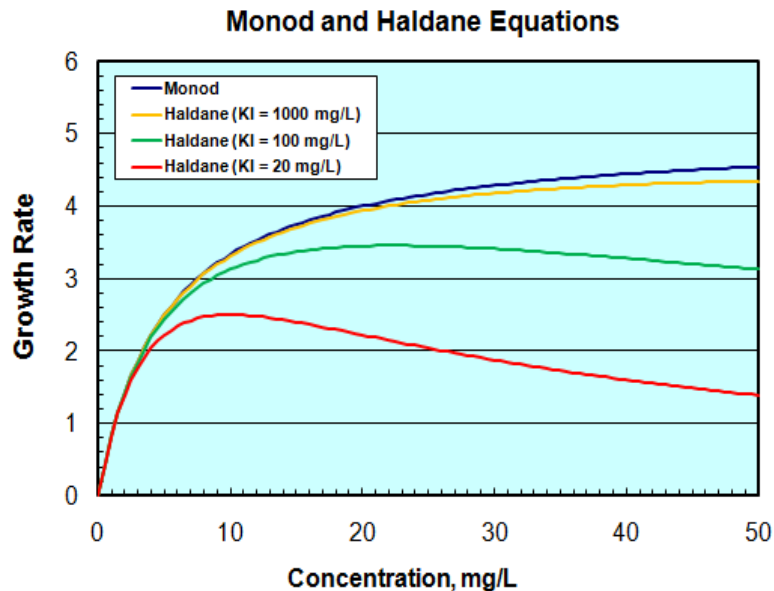
Manual reference:

Model Reference > Biological/Chemical Models > Sulfur Modeling



Model Addition – Industrial Organics

- **Based on original Alison Baker PhD (~1994, McMaster)**
 - Four new state variables for industrial components
 - Mixed removal pathways – **stripping** and/or **biodegradation**
 - Default settings for industrial components mimic xylene, phenol, benzene, and toluene
 - Biodegradation according to inhibitory Haldane kinetics



$$\mu = \mu_{max} \cdot \left[\frac{S}{K_S + S + \frac{S^2}{K_I}} \right]$$

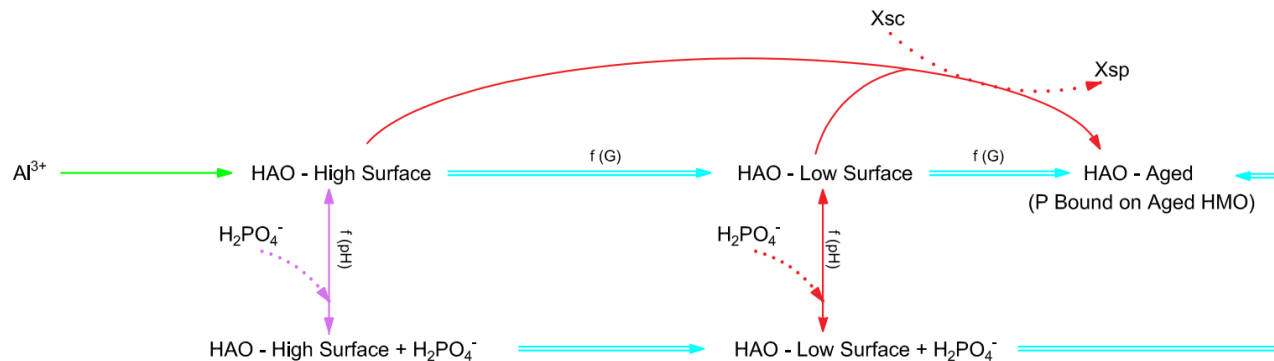
Manual reference:

Model Reference > Modeling of Industrial Components

Model Addition – Chemical Phosphorus

- **New P removal mechanisms (hydrated metal oxides)**
 - Based on EnviroSim-sponsored research
 - Extensive calibration for wastewater systems
 - Overcomes weaknesses of old “WEF model” (e.g. fixed Me:P stoichiometry)
 - Can have simultaneous ferric / ferrous / alum inputs

- ▶ Precipitation
- ▶ Aging
- ▶ Adsorption
- ▶ Co-precipitation

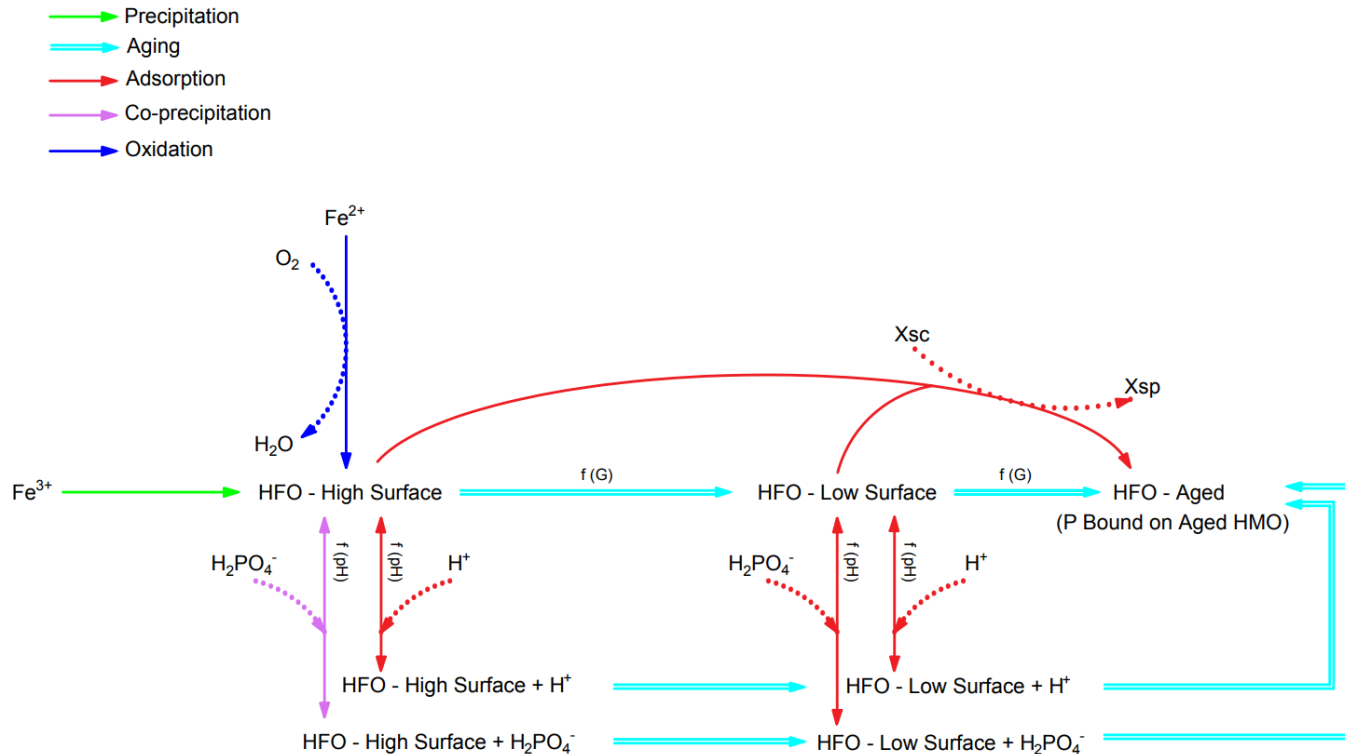


Manual reference:

Model Reference > Chemical Precipitation Reactions > Chemical Phosphorus Removal with Aluminum Salts

Model Addition – Chemical Phosphorus

■ Updated P removal mechanisms (hydrated metal oxides)

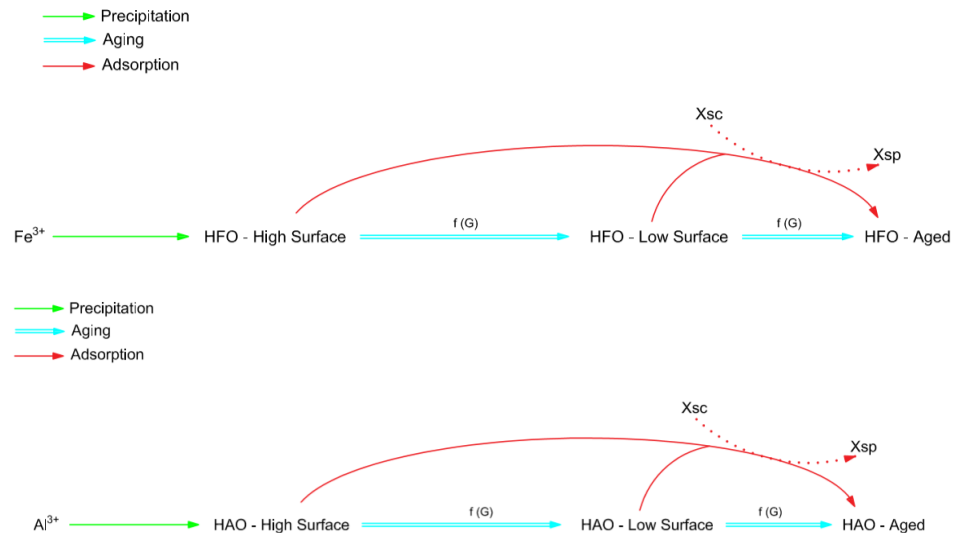


Manual reference:

Model Reference > Chemical Precipitation Reactions > Chemical Phosphorus Removal with Iron Salts

Model Addition – CEPT

- **Option to model colloidal COD / metal interactions**
 - Model can convert non-settleable colloidal COD to settleable particulate COD in the presence of hydrated metal oxides (HMO)
 - Process will also reduce potential adsorption of P on HMO
 - Ideal or model clarifier can then be used to mimic increased solids and BOD removal



Manual reference:

Model Reference > Chemical Precipitation Reactions > Modeling Metal-Colloidal Coagulation Reactions

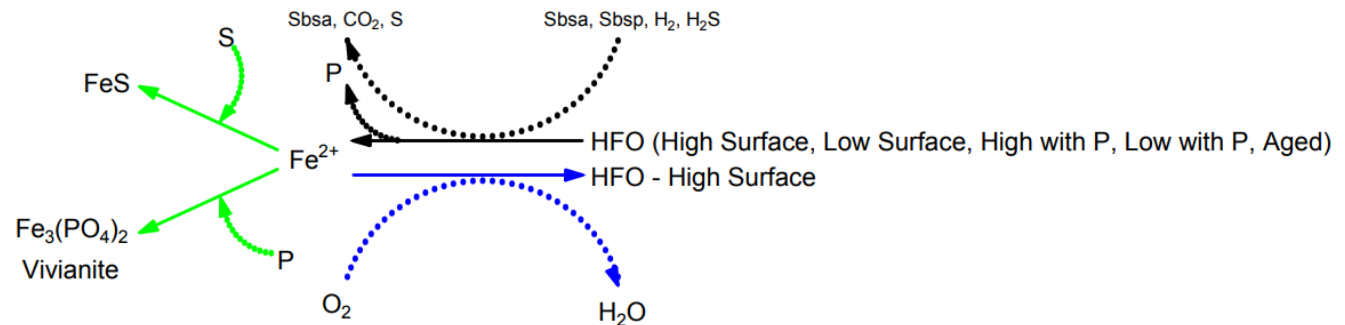
Model Addition – Iron RedOx

- **Option to model iron oxidation / reduction reactions**
 - New ferrous input (as either ferrous chloride or ferrous sulfate)
 - Ferrous oxidized to ferric in aerobic environments
 - Ferric reduced to ferrous in anaerobic environments
 - Option to track iron-based precipitates {*i.e.* FeS and vivianite $[\text{Fe}_3(\text{PO}_4)_2]$ }

→ Precipitation

→ Reduction

→ Oxidation



Manual reference:

Model Reference > Chemical Precipitation Reactions > Iron RedOx Reactions and Precipitation of Vivianite and FeS

Model Addition – Options for P Recovery

- **Improved tracking of Ca^{2+} and Mg^{2+}**
 - Previously Ca^{2+} and Mg^{2+} only available throughout the flowsheet *via* input of soluble influent concentrations
 - Underestimated the amounts entering digesters *via* solids streams limiting the amounts of potential precipitates
 - Model updated to include Ca^{2+} and Mg^{2+} in biomass (taken up as part of “synthesis ISS”) and influent degradable solids (X_{SP})
- **Additional sinks for P**
 - Vivianite formation
 - Struvite formation as in previous versions of BioWin but no longer Mg^{2+} limited!
 - Calcium phosphate precipitate (as Brushite)
 - ***Lowers return stream soluble PO_4 to levels typically observed***

Manual reference:

Model Reference > Chemical Precipitation Reactions > Precipitation of Brushite, Hydroxy-Apatite and Struvite

Model Addition – Cellulose

- **Cellulose tracking**

- Influent unbiodegradable particulate material split into two components: cellulose and non-cellulose
- Separate COD:VSS ratios for each
- Helps to fine-tune sludge production and digester performance
- Enables modelling of cellulose recovery

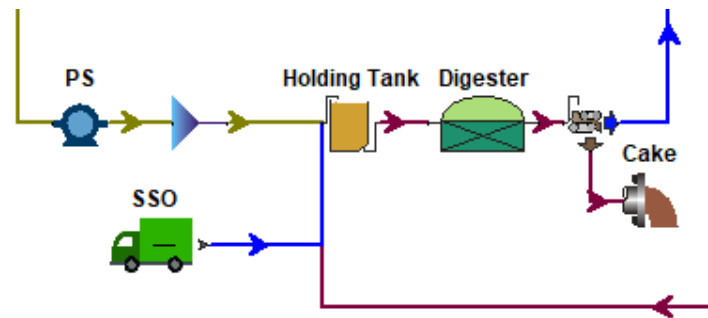
Manual references:

1. Model Reference > Biological/Chemical Models > Activated Sludge Processes > Growth and Decay of Ordinary Heterotrophic Biomass > Stoichiometric Parameters
2. Model Reference > Definition of Non-State Variables

Model Addition – SSO

- **New input for SSO**

- State variable ($COD_P - X_{EO}$) for adding particulate degradable COD (*e.g.* Source Separated Organics)
- ***Has specific COD:VSS***; added as a separate input to avoid conflicts with municipal wastewater characteristics
- Option to include N and P
- Constant or time-varying, as with any BioWin input



Manual references:

1. Model Reference > Biological/Chemical Models > Hydrolysis, Biological adsorption, Ammonification and Assimilative denitrification
2. Model Reference > Definition of Non-State Variables

Usability Upgrade – Drawing Toolbar



- **UNDO** button!! Use for accidental element deletion, moving, *etc.*
- Buttons for copying pipe format from one pipe to others
- Buttons for aligning flowsheet elements (vertical or horizontal centers)
- Buttons for spacing flowsheet elements evenly (vertically or horizontally)
- Buttons for flipping flowsheet element images (horizontally or vertically)
- Button for copying selected element(s)

Manual reference:

General Operation > Main Simulator Window > Toolbars > Flowsheet Tools

Usability Upgrade – Report to Excel

- Automatic rapid generation and export of data, charts, *etc.* to Excel
- Ideal for generating Mass Balance tables to use in PFDs
- Preconfigured templates are customizable
- Can incorporate “post-BioWin” calculations (*e.g.* MLVSS/MLSS, COD/BOD) using Excel formulas
- Option for including both steady state and dynamic simulation databases
- Can include BioWin charts – these are converted to Excel charts with data

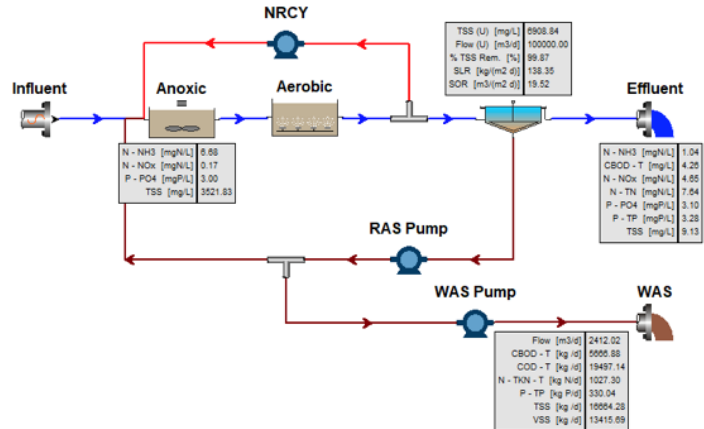
- Report to Word still available

Manual reference:

Data Output (charts, tables, reports) > Creating Project Reports > Creating an Excel Report

Usability Upgrade – Report to Excel

BioWin Mass Balance Summary



| Pipe Name | Mass Rate | | | | | | | | | | |
|-----------|--------------|-------------|--------------|-------------|-------------|-------------|----------------------------|----------------------------|------------|----------------------------|--|
| | FLOW m3/d | COD kg/d | eBOD kg/d | TSS kg/d | VSS kg/d | TKN kg/d | NH ₄ -N kg/d | NO _x -N kg/d | TP kg/d | PO ₄ -P kg/d | |
| F-01 | 100,000.0 | 50,000 | 24,521 | 22,271 | 19,771 | 4,000 | 2,640 | 0 | 650 | 325 | |
| F-02 | 497,588.0 | 2,066,615 | 606,634 | 1,752,419 | 1,413,482 | 110,671 | 3,325 | 86 | 35,265 | 1,491 | |
| F-03 | 497,588.0 | 2,044,829 | 592,708 | 1,742,104 | 1,402,492 | 107,991 | 516 | 2,314 | 35,265 | 1,545 | |
| F-04 | 197,588.0 | 811,984 | 235,359 | 691,775 | 556,918 | 42,882 | 205 | 919 | 14,003 | 613 | |
| F-05 | 97,588.0 | 3,652 | 416 | 891 | 717 | 291 | 101 | 454 | 320 | 303 | |
| F-06 | 100,000.0 | 808,332 | 234,943 | 690,884 | 556,201 | 42,591 | 104 | 465 | 13,683 | 310 | |
| F-07 | 100,000.0 | 808,332 | 234,943 | 690,884 | 556,201 | 42,591 | 104 | 465 | 13,683 | 310 | |
| F-08 | 97,588.0 | 788,835 | 229,276 | 674,220 | 542,785 | 41,564 | 101 | 454 | 13,353 | 303 | |
| F-09 | 2,412.0 | 19,497 | 5,667 | 16,664 | 13,416 | 1,027 | 2 | 11 | 330 | 7 | |
| F-10 | 2,412.0 | 19,497 | 5,667 | 16,664 | 13,416 | 1,027 | 2 | 11 | 330 | 7 | |
| F-11 | 300,000.0 | 1,232,845 | 357,349 | 1,050,329 | 845,575 | 65,109 | 311 | 1,395 | 21,262 | 931 | |
| F-12 | 300,000.0 | 1,232,845 | 357,349 | 1,050,329 | 845,575 | 65,109 | 311 | 1,395 | 21,262 | 931 | |

Usability Upgrade – Report to Excel

BioWin Tankage Summary

Volume Units: m3

| Reactors | Name | Volume |
|----------|--------------------|-----------------|
| | Aerobic | 40,000.0 |
| | Anoxic | 10,000.0 |
| | Group Total | 50,000.0 |

| Secondary Clarifiers | Name | Volume |
|----------------------|--------------------|-----------------|
| | Clarifier | 20,000.0 |
| | Group Total | 20,000.0 |

Total Volume for All Units **70,000.0**

BioWin Reactor Summary

All airflows reported at 20 deg C and 1 atm

Bioreactor

| Tank Name | AREA m2 | DEPTH m | VOLUME m3 | # DIFFUSERS | AIRFLOW m3/hr (20C, 1 atm) | DO mg/L | SOTR kg/hr | SOTE % | OTR kg/hr | OTE % | OUR mg/L/hr | MLSS mg/L | MLVSS mg/L | NH ₄ -N mg/L | NO ₂ -N mg/L | NO ₃ -N mg/L | NO _x -N mg/L | PO ₄ -P mg/L | pH | TOTAL MASS kg | MLVSS / MLSS % |
|----------------|---------------|------------|-----------------|---------------|-------------------------------|------------|---------------|-------------|--------------|-------------|----------------|--------------|---------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|------|------------------|-------------------|
| Anoxic | 2,222 | 4.50 | 10,000.0 | 0 | 0 | 0.0 | 0 | 100.0 | 0 | 100.0 | 0.0 | 3,522 | 2,841 | 6.7 | 0.0 | 0.2 | 0.2 | 3.0 | 6.99 | 35,218 | 80.7% |
| Aerobic | 8,889 | 4.50 | 40,000.0 | 21,680 | 49,292 | 2.0 | 4,195 | 30.5 | 1,393 | 10.1 | 33.8 | 3,501 | 2,819 | 1.0 | 0.3 | 4.3 | 4.7 | 3.1 | 6.86 | 140,044 | 80.5% |
| Average | | | | | 49,292 | 2.0 | 4,195 | 30.5 | 1,393 | 10.1 | 33.8 | 3,511 | 2,830 | 3.9 | 0.2 | 2.2 | 2.4 | 3.1 | | | 80.6% |
| Total | 11,111 | | 50,000.0 | 21,680 | 49,292 | | 4,195 | | 1,393 | | | | | | | | | | | 175,262 | |

Usability Upgrade – Variable Naming & Sorting

- Variables and parameters renamed for improved consistency
- Allows for simpler alphabetical sorting

BioWin Explorer - Click in left panel to refresh right panel

View

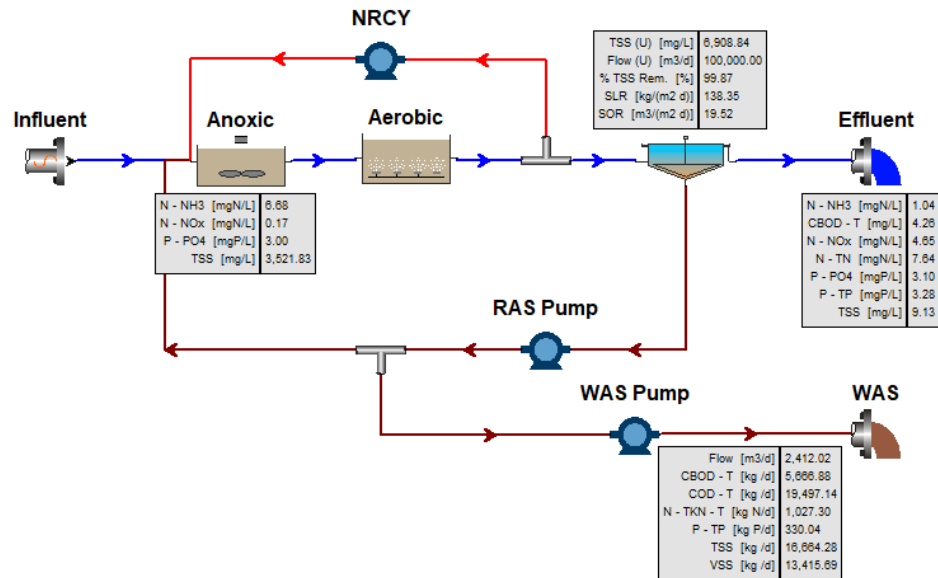
| Elements | State variable | Value | Mass rate [kg/d] | Notes |
|---------------|--|---------|------------------|-------------------|
| Bioreactor | Biomass - Acetoclastic methanogenic [mgCOD/L] | 0.11 | 12.80 | |
| Aerobic #1 | Biomass - Ammonia oxidizing [mgCOD/L] | 41.75 | 5010.07 | |
| Dissimilatory | Biomass - Anaerobic ammonia oxidizing [mgCOD/L] | 0.37 | 44.59 | |
| Aerobic #2 | Biomass - Endogenous products [mgCOD/L] | 549.55 | 65941.58 | |
| Aerobic #3 | Biomass - Hydrogenotrophic methanogenic [mgCOD/L] | 0.02 | 2.12 | |
| Aerobic #4 | Biomass - Methylophilic [mgCOD/L] | 40.99 | 4918.65 | |
| Anoxic #1 | Biomass - Nitrite oxidizing [mgCOD/L] | 23.72 | 2845.72 | |
| Anoxic #2 | Biomass - Ordinary heterotrophic [mgCOD/L] | 1170.10 | 140403.04 | |
| Denitritation | Biomass - Phosphorus accumulating [mgCOD/L] | 0.34 | 41.31 | |
| Denitritation | Biomass - Propionic acetogenic [mgCOD/L] | 0.09 | 10.76 | |
| Denitritation | Biomass - Sulfur oxidizing [mgCOD/L] | 52.64 | 3917.06 | |
| Denitritation | Biomass - Sulfur reducing acetotrophic [mgCOD/L] | 0.34 | 41.35 | |
| Denitritation | Biomass - Sulfur reducing hydrogenotrophic [mgCOD/L] | 8.88 | 1065.23 | |
| Denitritation | Biomass - Sulfur reducing propionic acetogenic [mgCOD/L] | 0.37 | 44.83 | |
| Denitritation | CODs - Adsorbed hydrocarbon [mgCOD/L] | 0.00 | 0.00 | |
| Denitritation | CODp - Degradable external organics [mgCOD/L] | 0.00 | 0.00 | |
| Denitritation | CODp - Slowly degradable colloidal [mgCOD/L] | 0.41 | 48.60 | |
| Denitritation | CODp - Slowly degradable particulate [mgCOD/L] | 86.02 | 10321.72 | |
| Denitritation | CODp - Stored PHA [mgCOD/L] | 0.00 | 0.55 | |
| Denitritation | CODp - Undegradable cellulose [mgCOD/L] | 302.13 | 36252.68 | |
| Denitritation | CODp - Undegradable non-cellulose [mgCOD/L] | 302.13 | 36252.68 | |
| Denitritation | CODs - Acetate [mgCOD/L] | 0.02 | 2.46 | |
| Denitritation | CODs - Complex readily degradable [mgCOD/L] | 1.43 | 171.18 | |
| Denitritation | CODs - Degradable volatile ind. #1 [mgCOD/L] | 0 | 0 | |
| Denitritation | CODs - Degradable volatile ind. #2 [mgCOD/L] | 0 | 0 | |
| Denitritation | CODs - Degradable volatile ind. #3 [mgCOD/L] | 0 | 0 | |
| Denitritation | CODs - Methanol [mgCOD/L] | 0.00 | 0.00 | |
| Denitritation | CODs - Propionate [mgCOD/L] | 0.00 | 0.38 | |
| Denitritation | CODs - Soluble hydrocarbon [mgCOD/L] | 0 | 0 | |
| Denitritation | CODs - Undegradable [mgCOD/L] | 28.00 | 3360.10 | |
| Denitritation | Gas - Dissolved hydrogen [mgCOD/L] | 0.03 | 3.06 | |
| Denitritation | Gas - Dissolved methane [mg/L] | 0.00 | 0.01 | |
| Denitritation | Gas - Dissolved nitrogen [mgN/L] | 17.23 | 2067.80 | |
| Denitritation | Gas - Dissolved nitrous oxide [mgN/L] | 0 | 0 | |
| Denitritation | Gas - Dissolved oxygen [mg/L] | 2.00 | 239.98 | |
| Denitritation | Gas - Dissolved total CO2 [mmol/L] | 5.50 | 659.76 | mmol/L and kmol/d |
| Denitritation | Gas - Dissolved total sulfides [mgS/L] | 0.54 | 64.33 | |
| Denitritation | HAD - Aged [mg/L] | 0 | 0 | |
| Denitritation | HAD - High surface [mg/L] | 0 | 0 | |
| Denitritation | HAD - High with H2PO4- adsorbed [mg/L] | 0 | 0 | |
| Denitritation | HAD - Low surface [mg/L] | 0 | 0 | |
| Denitritation | HAD - Low with H2PO4- adsorbed [mg/L] | 0 | 0 | |
| Denitritation | HFD - Aged [mg/L] | 0 | 0 | |
| Denitritation | HFD - High surface [mg/L] | 0 | 0 | |
| Denitritation | HFD - High with H+ adsorbed [mg/L] | 0 | 0 | |
| Denitritation | HFD - High with H2PO4- adsorbed [mg/L] | 0 | 0 | |
| Denitritation | HFD - Low surface [mg/L] | 0 | 0 | |
| Denitritation | HFD - Low with H+ adsorbed [mg/L] | 0 | 0 | |
| Denitritation | HFD - Low with H2PO4- adsorbed [mg/L] | 0 | 0 | |
| Denitritation | Influent inorganic suspended solids [mgSS/L] | 395.64 | 42673.96 | |
| Denitritation | Metal soluble - Aluminum [mg/L] | 0 | 0 | |
| Denitritation | Metal soluble - Calcium [mg/L] | 169.64 | 20344.05 | |
| Denitritation | Metal soluble - Ferric [mg/L] | 0 | 0 | |
| Denitritation | Metal soluble - Ferrous [mg/L] | 0 | 0 | |
| Denitritation | Metal soluble - Magnesium [mg/L] | 24.72 | 2966.34 | |
| Denitritation | N - Ammonia [mgN/L] | 2.74 | 328.76 | |
| Denitritation | N - Nitrate [mgN/L] | 2.04 | 244.23 | |
| Denitritation | N - Nitrite [mgN/L] | 0.77 | 92.60 | |
| Denitritation | N - Particulate degradable external organics [mgN/L] | 0 | 0 | |
| Denitritation | N - Particulate degradable organic [mgN/L] | 3.51 | 421.64 | |
| Denitritation | N - Particulate undegradable [mgN/L] | 10.57 | 1268.94 | |
| Denitritation | N - Soluble degradable organic [mgN/L] | 0.45 | 54.60 | |
| Denitritation | N - Soluble undegradable organic [mgN/L] | 0.80 | 96.03 | |
| Denitritation | Other Anions (strong acids) [meq/L] | 10.20 | 1223.99 | meq/L and kg/d |
| Denitritation | Other Cations (strong bases) [meq/L] | 4.57 | 556.77 | meq/L and kg/d |
| Denitritation | P - Bound on aged HMO [mgP/L] | 0 | 0 | |
| Denitritation | P - Particulate degradable external organics [mgP/L] | 0 | 0 | |
| Denitritation | P - Particulate degradable organic [mgP/L] | 1.23 | 148.18 | |
| Denitritation | P - Particulate undegradable [mgP/L] | 3.32 | 398.79 | |

Manual reference:

Model Reference > Definition of Non-State Variables

Usability Upgrade – Flowsheet Tags

- Customizable element-specific information
 - Information updates with simulations
 - Can contain state, combined, and element-specific variables

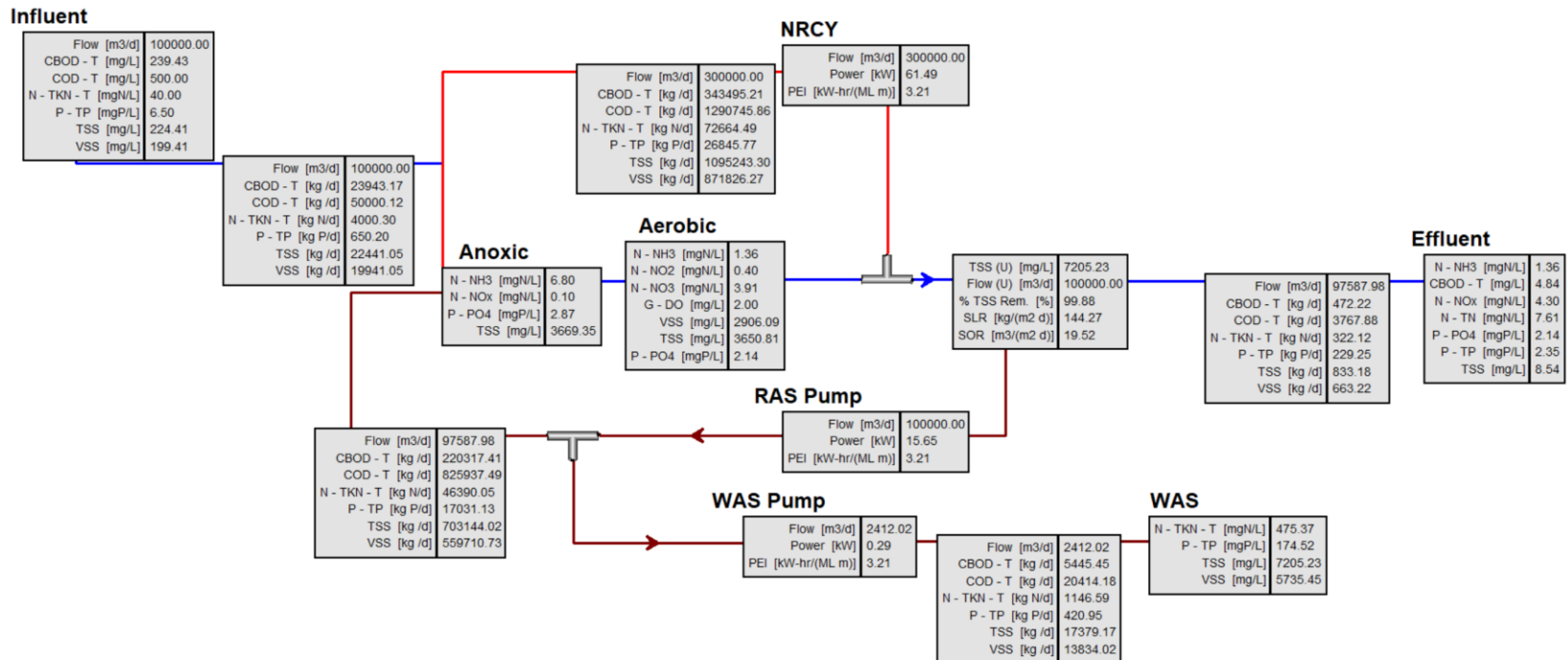


Manual references:

1. General Operation > Customizing BioWin > Customizing the Project Appearance > Drawing Board
2. General Operation > Customizing BioWin > Customizing the Work Environment > Default tags
3. General Operation > Managing BioWin Projects > Setting Project Options > Drawing Board Options

Usability Upgrade – Flowsheet Tags

- Customizable element-specific information
 - Can control location (above, below elements)
 - Can replace flowsheet icons if desired



Usability Upgrade – Integrated Influent Specifier



Influent Specifier - Untitled.ets

File Setting View Stoichiometry About

1 Input Measurements 2 Adjust Fractions 3 View Results 4 Export to BioWin

Raw (Unfiltered) Sample → Homogenize

Glass-Fiber Filter (1.2 μm)

Coagulate / Flocculate

Membrane Filter (0.45 μm)

COD - FF [mgCOD/L] 105.0

Table View

| | |
|------------------------|-------|
| COD - Total [mgCOD/L] | 500.0 |
| BOD - Total [mgBOD/L] | 245.2 |
| N - TKN [mgN/L] | 40.0 |
| P - Total P [mgP/L] | 6.5 |
| S - Total S [mgS/L] | 15.0 |
| Alkalinity [mgCaCO3/L] | 300.0 |

| | |
|-----------------|-------|
| TSS [mgTSS/L] | 242.7 |
| VSS [(mgVSS/L)] | 197.7 |

| | |
|-------------------------------|-------|
| COD - Filtered [mgCOD/L] | 184.9 |
| CODs - Acetate [mgCOD/L] | 12.0 |
| BOD - Filtered [mgBOD/L] | 102.5 |
| N - Ammonia [mgN/L] | 26.4 |
| N - Nitrate [mgN/L] | 0.0 |
| P - Soluble phosphate [mgP/L] | 3.3 |

Other Measurements:

| | | | | | |
|------|-----|------------------------|------|-----------------------------------|------|
| Flow | 0.0 | Gas - DO [mgO2/L] | 0.0 | Effluent COD - Filtered [mgCOD/L] | 25.0 |
| pH | 7.3 | Metal - Calcium [mg/L] | 80.0 | Metal - Magnesium [mg/L] | 15.0 |

Usability Upgrade – Integrated Influent Specifier



Components of Influent

Influent Components (COD, N, P and ISS content) - Select tabs at lower left

Measured Calculated

cBOD5 245.2051 245.2051

fcBOD5 (GFC) 102.4611 102.4611

COD - Total
500.0000 mgCOD/L

k1 for CODc - Xsc: 0.5000

k2 for CODp - Xsp: 0.5000

Biomass
Fbio. = 0.0212
Conc = 10.6000 mgCOD/L

Degradable
Fdeg = 0.7988
Conc = 399.4000 mgCOD/L

Undegradable
Fundeg = 0.1800
Conc = 90.0000 mgCOD/L

Readily degradable
Fbs = 0.1600
Conc = 80.0000 mgCOD/L

Slowly degradable
Fxs = 0.6388
Conc = 319.4000 mgCOD/L

CODs - Undegradable
Fus = 0.0500
Conc = 25.0000 mgCOD/L

CODp - Undegradable
Fup = 0.1300
Conc = 65.0000 mgCOD/L

CODs - Complex readily degradable
Fbsc = 0.8500
Conc = 68.0000 mgCOD/L

CODs - Acetate
Fac = 0.1500
Conc = 12.0000 mgCOD/L

CODc - Slowly degradable colloidal
Fxcsc = 0.2500
Conc = 79.8500 mgCOD/L

CODp - Slowly degradable
Fxsp = 0.7500
Conc = 239.5500 mgCOD/L

CODp - Undegradable cellulose
Fcel = 0.5000
Conc = 32.5000 mgCOD/L

CODp - Undegradable non-cellulose
Fnoncel = 0.5000
Conc = 32.5000 mgCOD/L

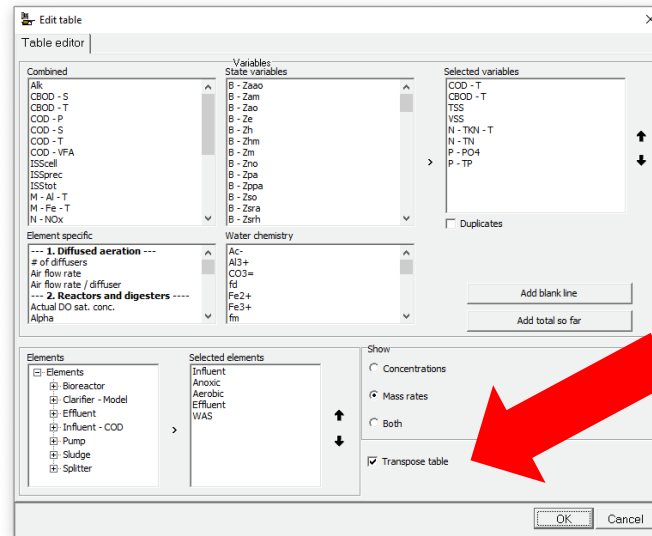
COD N P ISS

Tabs to view COD, N, P speciation

Close

Usability Upgrade – Transpose Tables

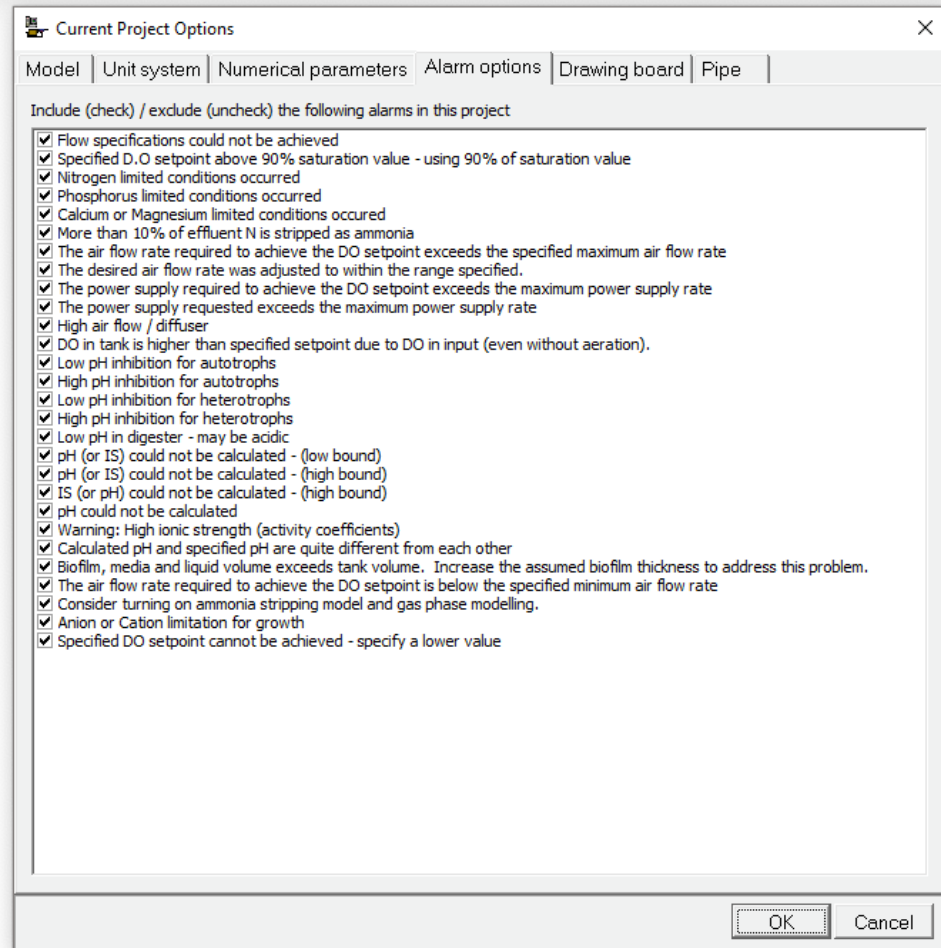
| Elements | COD - Total [kg /d] | BOD - Total Carbonaceous [kg /d] | Total suspended solids [kg /d] | Volatile suspended solids [kg /d] | N - Total Kjeldahl Nitrogen [kg N/d] | N - Total N [kg N/d] | P - Soluble PO4-P [kg P/d] | P - Total P [kg P/d] |
|----------|---------------------|----------------------------------|--------------------------------|-----------------------------------|--------------------------------------|----------------------|----------------------------|----------------------|
| Influent | 50,000.12 | 24,520.56 | 22,271.22 | 19,771.22 | 4,000.30 | 4,000.30 | 325.10 | 650.20 |
| Anoxic | 2,066,615.31 | 606,633.78 | 1,752,419.23 | 1,413,482.37 | 110,671.03 | 110,756.71 | 1,491.33 | 35,265.05 |
| Aerobic | 2,044,828.86 | 592,708.01 | 1,742,104.19 | 1,402,492.50 | 107,991.14 | 110,305.17 | 1,544.55 | 35,265.05 |
| Effluent | 3,652.17 | 416.10 | 890.51 | 716.91 | 291.45 | 745.29 | 302.92 | 320.16 |
| WAS | 19,497.14 | 5,666.88 | 16,664.28 | 13,415.69 | 1,027.30 | 1,038.52 | 7.49 | 330.04 |



| Elements | Influent | Anoxic | Aerobic | Effluent | WAS |
|--------------------------------------|-----------|--------------|--------------|----------|-----------|
| COD - Total [kg /d] | 50,000.12 | 2,066,615.31 | 2,044,828.86 | 3,652.17 | 19,497.14 |
| BOD - Total Carbonaceous [kg /d] | 24,520.56 | 606,633.78 | 592,708.01 | 416.10 | 5,666.88 |
| Total suspended solids [kg /d] | 22,271.22 | 1,752,419.23 | 1,742,104.19 | 890.51 | 16,664.28 |
| Volatile suspended solids [kg /d] | 19,771.22 | 1,413,482.37 | 1,402,492.50 | 716.91 | 13,415.69 |
| N - Total Kjeldahl Nitrogen [kg N/d] | 4,000.30 | 110,671.03 | 107,991.14 | 291.45 | 1,027.30 |
| N - Total N [kg N/d] | 4,000.30 | 110,756.71 | 110,305.17 | 745.29 | 1,038.52 |
| P - Soluble PO4-P [kg P/d] | 325.10 | 1,491.33 | 1,544.55 | 302.92 | 7.49 |
| P - Total P [kg P/d] | 650.20 | 35,265.05 | 35,265.05 | 320.16 | 330.04 |

Usability Upgrade – Optional Alarms

- As part of the project options, select which alarms are active

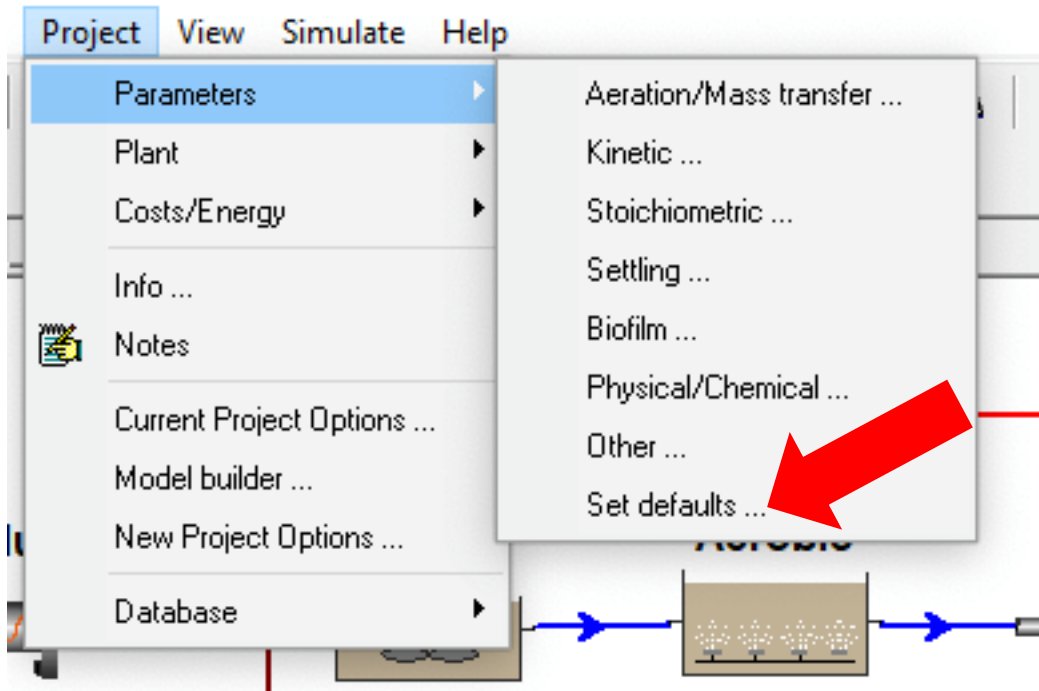


Manual reference:

General Operation > Managing BioWin Projects > Setting Project Options > Alarm Options

Usability Upgrade – Set All Parameters to Default

- Use to upgrade older models to Version 6

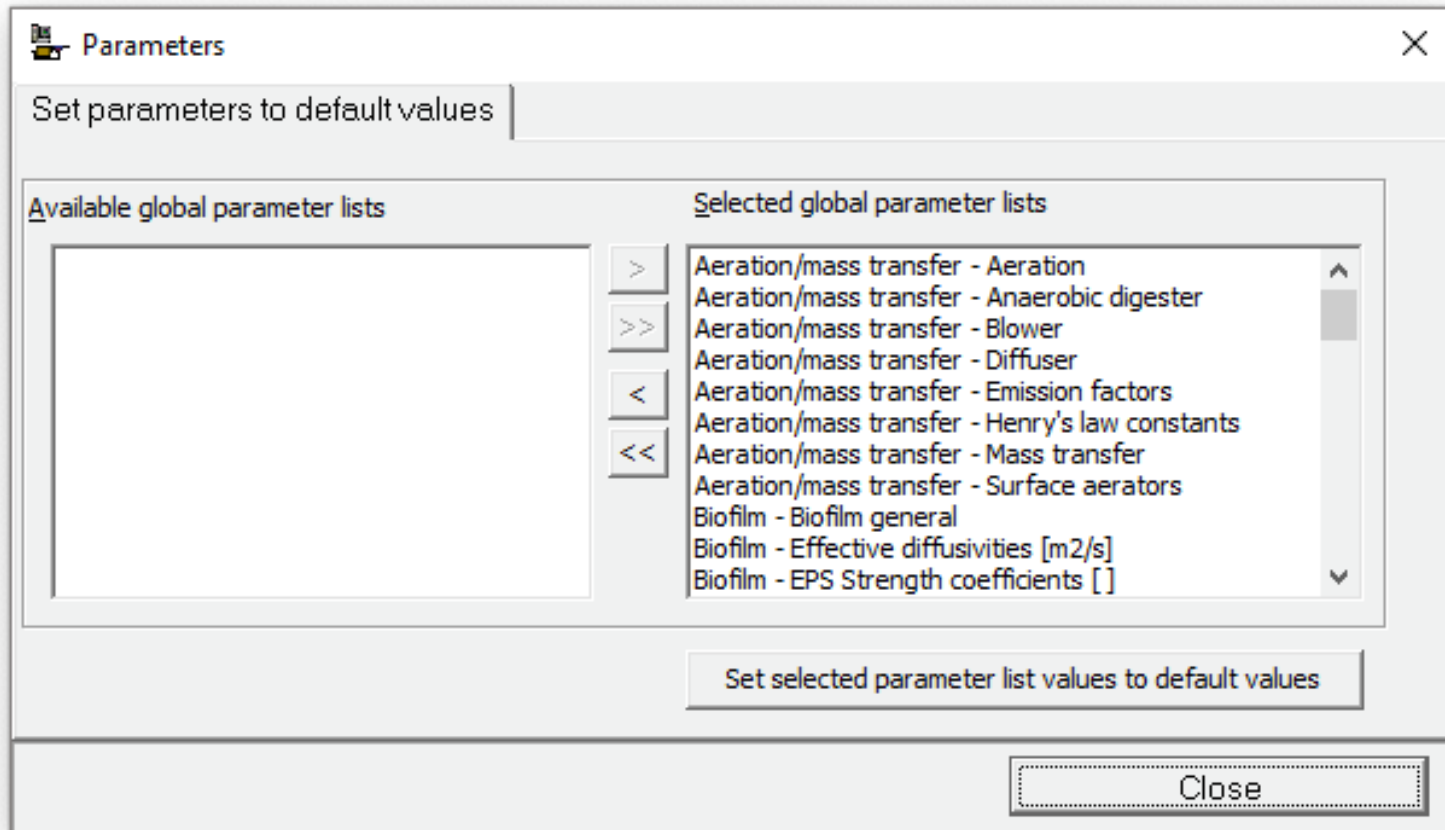


Manual reference:

General Operation > Managing BioWin Projects > Specifying Project Model Parameter Values

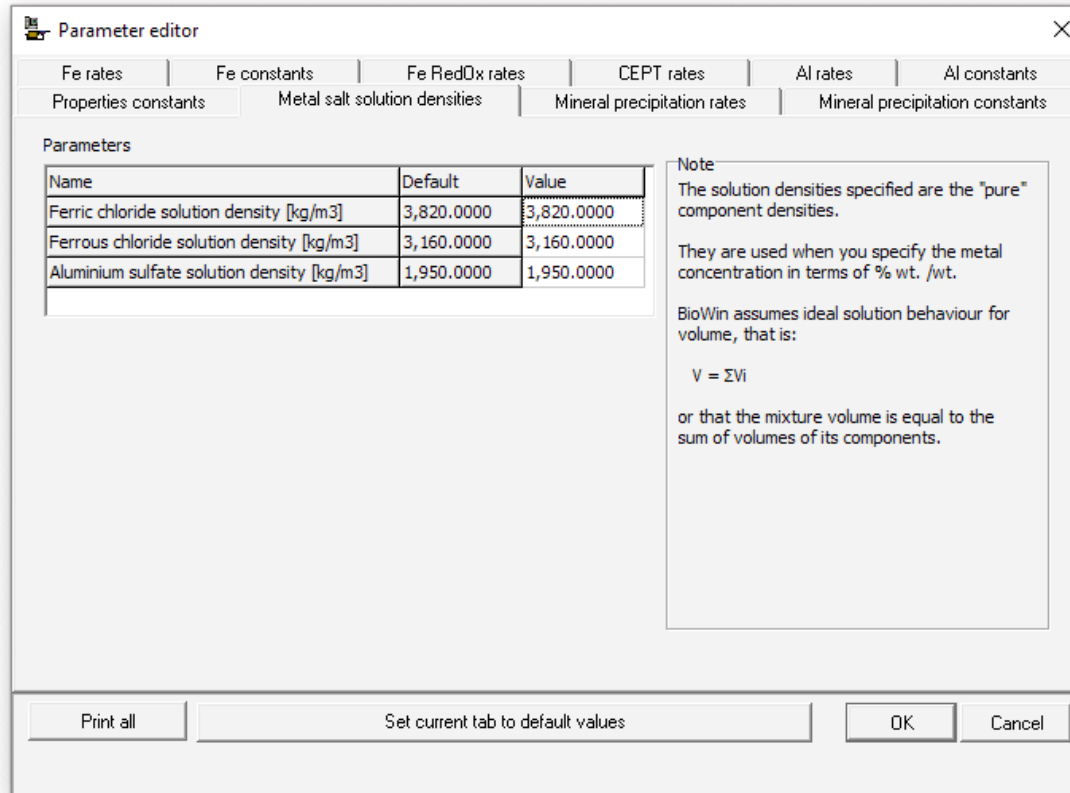
Usability Upgrade – Set All Parameters to Default

- Specify which parameter sets to update



Usability Upgrade – Solution Densities

- For metal salt input streams

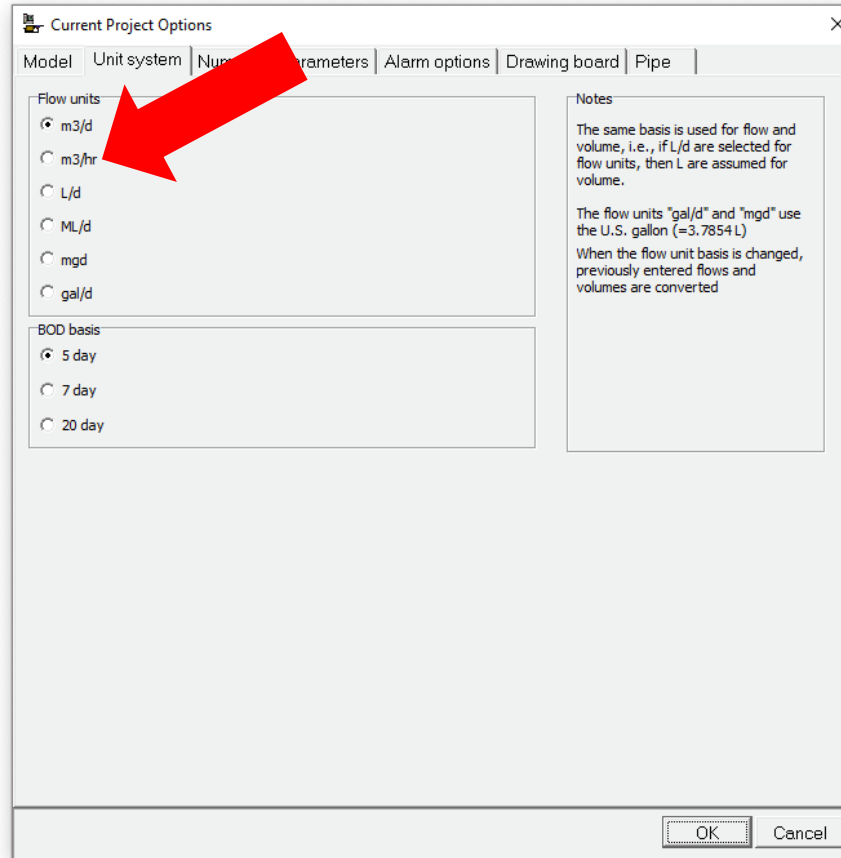


Manual reference:

Model Reference > Chemical Precipitation Reactions

Usability Upgrade – Additional Flow Units

- Cubic meters per hour option for smaller systems

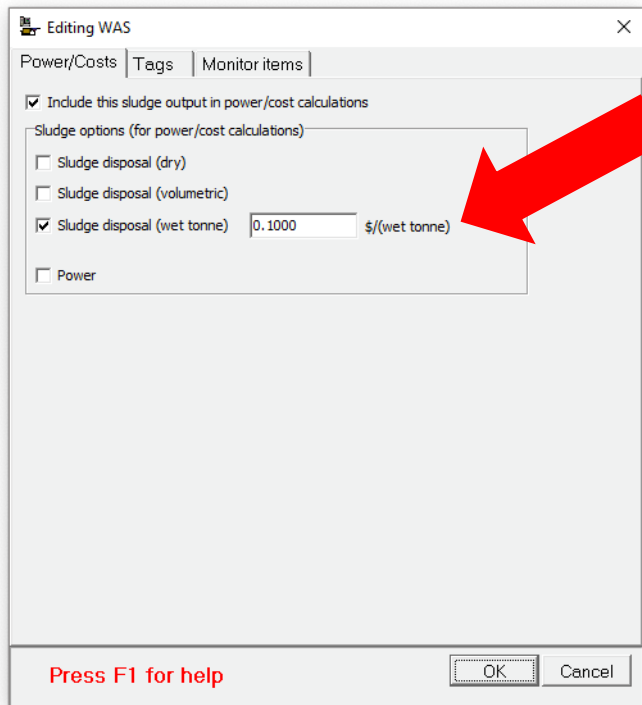


Manual reference:

General Operation > Managing BioWin Projects > Setting Project Options > Unit System

Usability Upgrade – \$ per wet tonne sludge costs

- Third sludge disposal cost option added

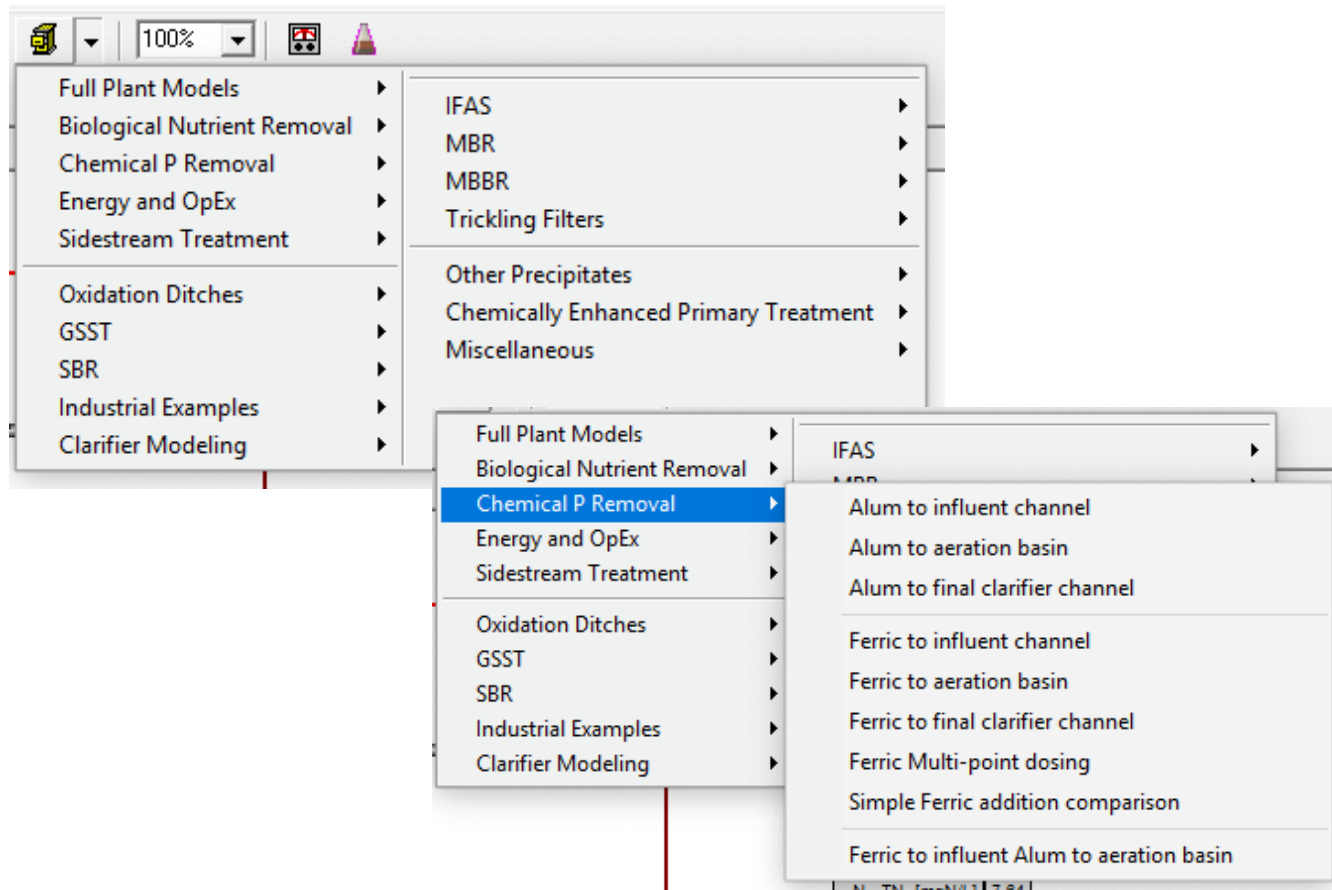


Manual reference:

Operating Costs in BioWin > Operating Costs > Sludge

Usability Upgrade – More Examples!!

- BioWin Cabinet reorganized and greatly expanded with additional examples



Enjoy Using BioWin 6.0

support@envirosim.com