

## APPENDIX E

Contains microscopic evaluation data from both the cyanide and pH source-effect experiments. Evaluations were completed until no differences were observed between reactors. All measurements were subjective.

**Table E.1 Microscopy data for 10 day SRT biomass during pH source-effect experiment**

	3/22/2002 -Cycle 2				3/23/02 -Cycle 5				3/24/02 -Cycle 9				3/25/02 -Cycle 13			
	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11
<b>Floc Diameter</b> (Blocks at 10X Lens)	4	4	3	2.5	3	3	3	4	3	3	3	3	3	3	3	2
<b>Floc Morphology</b> (Firm, Weak, Round, Irregular, etc.)		dense, round, some free cells	dense, round, many free cells	dense, round, many free cells	small, firm, round, some free cells	small, firm, round, some free cells	small, firm, round, some free cells	firm, round, compact, many free cells	small, firm, round, some free cells	small, firm, round, some free cells	small, firm, round, some free cells	small, firm, round, some free cells	small, firm, round, some free cells	less firm and dense, more free cells	murky, diffuse, many free cells	
<b>Filament Abundance</b> (0-6 Scale)	2	1.5	1.5	1	2	3	3	2	2	2	3	2	2	2	2	2
<b>Shelled Amoeba</b> (0-6 Scale)	1	1	0	0	2	2	2	1	3	2	2	1	2	1	1	0
<b>Flagellates (0-4 Scale)</b>																
Small/Fast	0	0	0	0	2	2	2	0	2	1	1	0	1	1	1	0
Large/Slow	0	0	0	0	2	1	1	0	1	0	0	0	0	0	0	0
<b>Ciliates (0-4 Scale)</b>																
-Bulk Free-Swimmers	2	3	3	2	3	3	3	1	3	2	2	1	3	2	2	1
-Crawling	2	2	1	0	1	1	0	0	1	1	0	0	2	2	1	0
-Carnivores	2	2	2	0	2	2	2	0	2	2	2	0	2	2	2	0
-Stalked																
-wide mouth	2	2	2	0	2	2	2	1	2	2	2	2	2	2	2	1
-narrow mouth	1	1	1	1	0	2	1	0	0	1	0	0	1	1	0	1
<b>Metazoa Comments</b>																
	many rotifer	some rotifer	some rotifer	none	many rotifers	some rotifers	few rotifers	none	many rotifers	some rotifers	some rotifers	none	some rotifers	some rotifers	some rotifers	1 nematode

**Table E.1 cont'd Microscopy data for 10 day SRT biomass during pH source-effect experiment**

	3/26/02 -Cycle 17				3/27/02 -Cycle 21				3/28/02 -Cycle 24				3/29/02 -Cycle 29			
	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11
<b>Floc Diameter</b> (Blocks at 10X Lens)	3	3.5	3.5	4	2.5	3.5	3	2.5	3	4	4	2.5	3.5	4	3	2.5
<b>Floc Morphology</b> Firm, Weak, Round, Irregular, etc	firm, round, some free cells	more dense, irregular, some free cells	round, fair dense, some free cells	round, fair dense, some free cells	irregular, diffuse, some free cells	dense, mostly round	dense, round, some free cells	irregular, diffuse, some free cells	irregular, some free cells	dense, round, some free cells	dense, round, some free cells	diffuse, very irregular, few free cells	firm, round, compact, some fingering	firm, round, compact, some fingering	firm, round, compact, some fingering	ir- regular, diffuse, some free cells
<b>Filament Abundance</b> (0-6 Scale)	2	2	2	2	2	2	3	2	2.5	2	2.5	2	2	2	2	2
<b>Shelled Amoeba</b> (0-6 Scale)	0	1	1	0	1	0	2	1	1	1	2	1	1	1	1	0
<b>Flagellates (0-4 Scale)</b>																
Small/Fast	2	1	2	2	2	2	2	1	2	2	2	1	1	1	1	0
Large/Slow	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	0
<b>Ciliates (0-4 Scale)</b>																
-Bulk Free-Swimmers	1	1	1	1	2	1	2	2	2	2	2	1	2	2	2	2
-Crawling	2	2	2	0	2	3	2	0	3	3	2	1	4	3	3	1
-Carnivores	0	1	2	0	1	2	2	1	2	1	2	0	2	2	2	1
-Stalked																
-wide mouth	2	2	2	0	2	2	2	1	2	2	2	1	2	2	2	1
-narrow mouth	1	1	0	1	1	0	1	1	0	1	1	1	1	2	2	1
<b>Metazoa Comments</b>	1 nematode some rotifers	1 nematode some rotifers	1 nematode some rotifers	none	some rotifers	1 nematode	some rotifers	none	some rotifers	1 nematode, some rotifers	some rotifers	none	few rotifers	few rotifer	none	none

**Table E.1 cont'd Microscopy data for 10 day SRT biomass during pH source-effect experiment**

	3/30/02 -Cycle 33				3/31/02 -Cycle 37				4/2/02 -Cycle 45				4/4/02 -Cycle 53			
	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11
<b>Floc Diameter</b> (Blocks at 10X Lens)	3	3.5	3	2.5	3	3	3	2.5	4	4	3.5	2.5	4	4.5	4.5	3.5
<b>Floc Morphology</b> (Firm, Weak, Round, Irregular, etc.)	firm, round, dense, some fingering	firm, round, dense, some fingerin g	firm, round, dense, some fingerin g	ir- regular, diffuse	firm, round, some free cells	firm, round, some free cells	firm, round, some free cells	irregular, diffuse, many free cells	firm, compact, round	firm, compact, round	firm, some irregular	very irregular, diffuse, some free cells	round, compact, some free cells	dense, a little ir- regular	dense, a little irregular	diffuse, irregular
<b>Filament Abundance</b> (0-6 Scale)	2.5	2.5	2	2	2	2	2	2	2	2	2	2	2	2	2	2
<b>Shelled Amoeba</b> (0-6 Scale)	2	2	1	0	2	1	2	0	1	1	1	2	1	1	0	0
<b>Flagellates (0-4 Scale)</b>								0								
Small/Fast	2	1	1	1	1	1	1	0	2	2	1	1	2	1	2	0
Large/Slow	1	1	1	0	0	1	1		0	1	1	1	1	0	1	0
<b>Ciliates (0-4 Scale)</b>																
-Bulk Free-Swimmers	2	2	2	2	2	1	1	1	2	1	1	1	1	1	2	2
-Crawling	3	3	2	0	3	2	2	1	0	0	0	3	0	0	0	3
-Carnivores	2	2	2	1	2	2	2	1	2	2	2	1	2	1	2	1
-Stalked																
-wide mouth	2	2	2	1	2	2	2	2	2	2	1	0	2	2	2	1
-narrow mouth	1	2	2	1	1	1	2	1	1	0	1	2	0	1	1	1
<b>Metazoa Comments</b>	few rotifers	few rotifer	none	none	few rotifers	few rotifers	few rotifers	none	many rotifers, 1 nema- tode	many rotifers, 1 nematode	many rotifers, 1 nema- tode	none	many rotifers nema-tode	many one nema- tode	many rotifers two nema- todes	some rotifers

**Table E.1 cont'd Microscopy data for 10 day SRT biomass during pH source-effect experiment**

	4/6/02 -Cycle 61				4/10/2002 -Cycle 77				4/16/02 -Cycle 101				4/18/02 -Cycle 109			
	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11
<b>Floc Diameter</b> (Blocks at 10X Lens)	4	3.5	4	2.5	4.5	4.5	4	3	3.5	4	4.5	2.5	4.5	4.5	4	2.5
<b>Floc Morphology</b> Firm, Weak, Round, Irregular, etc	firm, round, some fingering	firm, round, some fingering	firm, round, some fingering	weak, irregular, some fingering	dense, round, firm	dense, little irregular, some free cells	dense, little irregular, some free cells	diffuse, irregular	round, dense, may free cells	dense, mostly round, some free cells	dense, mostly round, some free cells	dense, irregular	dense, round, some finger-ing	dense, firm, round	dense, diffuse, ir regular, many free cells	diffuse, ir regular, many free cells
<b>Filament Abundance</b> (0-6 Scale)	2	2	3	2	2	2	2	2	3	2	2	2	1.5	2	2	1.5
<b>Shelled Amoeba</b> (0-6 Scale)	3	2	2	1	2	2	2	0	0	0	1	2	1	1	0	1
<b>Flagellates (0-4 Scale)</b>																
Small/Fast	0	1	0	0	2	2	2	2	1	0	1	1	2	2	2	1
Large/Slow	1	1	2	0	1	0	1	0	0	0	0	1	0	1	0	0
<b>Ciliates (0-4 Scale)</b>																
-Bulk Free-Swimmers	1	2	3	1	1	2	1	1	1	1	1	1	2	2	2	1
-Crawling	1	0	0	1	0	0	0	0	0	0	0	2	1	1	0	2
-Carnivores	2	2	1	1	0	0	0	2	0	0	0	2	0	0	0	1
-Stalked																
-wide mouth	1	2	2	0	2	2	2	2	2	1	2	0.5	2	2	2	1
-narrow mouth	1	1	1	1	1	0	1	2	0	1	0	0	2	2	1	0
<b>Metazoa Comments</b>	many rotifers, few nematode	many rotifers, few nematode	many rotifers, few nematode	very few rotifers	many rotifers few nema- tode	many rotifers few nematode	many rotifers few nema- tode	some rotifers	many rotifers and nematode	some rotifers many nema- tode	some rotifers many nema- tode	many rotifers	blood- worm some rotifer, nema- tode	many nema- tode	some rotifers and nematod e	many rotifers

**Table E.1 cont'd Microscopy data for 10 day SRT biomass during pH source-effect experiment**

	4/21/02 -Cycle 121			
	Control	pH 5	pH 9	pH 11
<b>Floc Diameter</b> (Blocks at 10X Lens)	4	4.5	4.5	2
<b>Floc Morphology</b> (Firm, Weak, Round, Irregular, etc.)	dense, round, compact, few free cells	dense, round, compact, few free cells	dense, round, compact, few free cells	diffuse, small, irregular, many free cells
<b>Filament Abundance</b> (0-6 Scale)	2	2	2	2
<b>Shelled Amoeba</b> (0-6 Scale)	2	2	1	1
<b>Flagellates (0-4 Scale)</b>				
Small/Fast	1	2	2	0
Large/Slow	1	0	0	1
<b>Ciliates (0-4 Scale)</b>				
-Bulk Free-Swimmers	2	2	2	2
-Crawling	0	0	0	1
-Carnivores	1	2	2	1
-Stalked				
-wide mouth	2	2	3	1
-narrow mouth	2	1	1	0
<b>Metazoa Comments</b>	some rotifers, some blood-wms	many rotifer some blood-wms	few rotifer some nema-tode	many rotifers

**Table E.2 Microscopy data for 2 day SRT biomass during pH source-effect experiment**

	11/22/2002 -Cycle 2				11/23/02 -Cycle 5				11/24/02 -Cycle 8				11/25/02 -Cycle 12			
	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11
<b>Floc Diameter</b> (Blocks at 10X Lens)	4	2	6	1	6	4	4	2	4	4	6	1	3.5	4	5.5	1
<b>Floc Morphology</b> Firm, Weak, Round, Irregular, etc	weak, fingering, free cells	weak, many free cells	more dense, fingering, more free cells	weak, very diffuse, many free cells	weak, finger-ing, free cells	weak, fingering, free cells	weak, fingering, free cells	weak, fingering, less free cells	weak, diffuse, many free cells	weak, diffuse, many free cells	weak, diffuse, many free cells	very weak, diffuse, not many free cells	diffuse, many free cells, weak	diffuse, many free cells, weak	diffuse, many free cells, weak	diffuse, many free cells, weak
<b>Filament Abundance</b> (0-6 Scale)	3	3	4	2	3	3	3	2	3	3	3	1	3	2	3	1
<b>Shelled Amoeba</b> (0-6 Scale)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Flagellates (0-4 Scale)</b>																
Small/Fast	1	1	2	0	2	2	1	1	1	2	2	0	1	2	2	0
Large/Slow	2	1	2	0	1	1	0	0	1	1	2	0	1	1	1	0
<b>Ciliates (0-4 Scale)</b>																
-Bulk Free-Swimmers	2	2	2	0	2	2	1	0	2	3	3	1	2	2	2	1
-Crawling	2	0	1	0	3	3	3	0	3	2	3	1	3	2	3	1
-Carnivores	2	1	1	0	1	0	1	0	1	1	1	0	1	1	1	0
-Stalked																
-wide mouth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-narrow mouth	3	2	2	0	2	3	3	1	3	2	3	2	3	2	2	2
<b>Metazoa Comments</b>																
	some rotifers	none	some rotifers	none	some rotifers	few rotifers	some rotifers	few rotifers	some rotifers	some rotifers	some rotifers	none	some rotifers	some rotifers	some rotifers	none

**Table E.2 cont'd Microscopy data for 2 day SRT biomass during pH source-effect experiment**

	11/26/02 -Cycle 15				11/27/02 -Cycle 20				11/28/02 -Cycle 24			
	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11	Control	pH 5	pH 9	pH 11
<b>Floc Diameter</b> (Blocks at 10X Lens)	3	2	2	3	4	3	3	4	4	3	2	4
<b>Floc Morphology</b> (Firm, Weak, Round, Irregular, etc.)	fairly dense, many free cells	same but more diffuse	fairly dense, many free cells	tons of free cells, very dense	diffuse, many free cells	diffuse, many free cells	same, but less dense	same, but less free cells	diffuse, many free cells	diffuse, many free cells	diffuse, many free cells	diffuse, many free cells
<b>Filament Abundance</b> (0-6 Scale)	3	2.5	3	1	3	3	3	1	3	3	3	1
<b>Shelled Amoeba</b> (0-6 Scale)	0	0	0	1	0	0	0	0	0	0	0	0
<b>Flagellates (0-4 Scale)</b>												
Small/Fast	1	0	0	0	1	1	1	2	1	1	1	0
Large/Slow	0	0	0	0	1	1	1	0	0	0	1	0
<b>Ciliates (0-4 Scale)</b>												
-Bulk Free-Swimmers	2	2	1	1	2	2	2	0	2	2	1	1
-Crawling	3	2	2	0	3	2	2	1	3	3	2	1
-Carnivores	1	0	0	0	1	1	0	0	1	0	0	0
-Stalked												
-wide mouth	0	1	1	1	0	0	0	0	0	0	0	0
-narrow mouth	2	1	1	2	2	2	2	1	1	1	2	1
<b>Metazoa Comments</b>												
	none	none	none	none	some rotifers	1 rotifer	none	none	some rotifers	none	none	none

**Table E.3 Microscopy data for 10 day SRT biomass during cyanide source-effect experiment**

	2/19/2003 -Cycle 2				2/20/02 -Cycle 5				2/21/03 -Cycle 9			
	Control	IC15	IC25	IC50	Control	IC15	IC25	IC50	Control	IC15	IC25	IC50
<b>Floc Diameter</b> (Blocks at 10X Lens)	4	4	4	4	4	4	4	4	4	4	4	4
<b>Floc Morphology</b> Firm, Weak, Round, Irregular, etc	dense, round, few free cells	dense, round, few free cells	dense, round, few free cells	dense, round, few free cells	small, firm, round, some free cells	small, firm, round, some free cells	small, firm, round, some free cells	small, firm, round, some free cells	small, firm, round, some free cells	small, firm, round, some free cells	small, firm, round, some free cells	small, firm, round, some free cells
<b>Filament Abundance</b> (0-6 Scale)	2	1.5	1.5	1.5	2	2	2	2	2	2	3	2
<b>Shelled Amoeba</b> (0-6 Scale)	1	1	0	0	1	1	1	0	1	0	0	0
<b>Flagellates (0-4 Scale)</b>												
Small/Fast	0	0	0	0	0	1	0	0	0	0	0	0
Large/Slow	0	0	0	0	0	1	0	0	0	0	0	0
<b>Ciliates (0-4 Scale)</b>												
-Bulk Free-Swimmers	2	3	3	2	3	3	3	1	2	2	2	1
-Crawling	2	2	1	2	1	1	0	0	1	1	1	0
-Carnivores	2	2	2	1	2	2	2	0	2	2	1	1
-Stalked												
-wide mouth	2	2	2	1	2	2	2	1	2	2	1	1
-narrow mouth	1	1	1	1	0	2	1	0	1	1	0	0
<b>Metazoa Comments</b>												
	many rotifer	some rotifers	some rotifers	few rotifers	many rotifers	some rotifers	few rotifers	few rotifers	many rotifers	some rotifers	some rotifers	few rotifers

Microscopy was discontinued as no differences were seen in the first nine cycles.



**Table E.4 Microscopy data for 2 day SRT biomass during cyanide source-effect experiment**

	2/19/2003 -Cycle 2				2/20/02 -Cycle 5				2/21/03 -Cycle 9			
	Control	IC15	IC25	IC50	Control	IC15	IC25	IC50	Control	IC15	IC25	IC50
<b>Floc Diameter</b> (Blocks at 10X Lens)	3.5	3	3.5	3.5	3.5	3.5	3	3	3.5	3	3	3.5
<b>Floc Morphology</b> (Firm, Weak, Round, Irregular, etc.)		dense, round, firm, few free cells	dense, round, free cells	dense, round, some free cells	dense, round, free cells	dense, round, few free cells	dense, round, free cells	dense, round, few free cells	dense, firm, round, some free cells	dense, firm, round, some free cells	dense, firm, round, some free cells	dense, firm, round, some free cells
<b>Filament Abundance</b> (0-6 Scale)	2	1.5	2	2	2	2	2	2	2	2	2	2
<b>Shelled Amoeba</b> (0-6 Scale)	0	0	0	0	1	0	0	0	1	0	0	0
<b>Flagellates (0-4 Scale)</b>												
Small/Fast	0	0	0	0	0	0	0	0	0	0	0	0
Large/Slow	0	0	0	0	0	0	0	0	0	0	0	0
<b>Ciliates (0-4 Scale)</b>												
-Bulk Free-Swimmers	2	1	1	1	2	2	1	1	2	2	1	1
-Crawling	2	2	1	1	2	1	0	0	2	1	1	0
-Carnivores	1	1	1	1	1	1	1	0	1	1	1	0
-Stalked												
-wide mouth	2	2	2	1	2	2	2	1	2	2	1	1
-narrow mouth	1	1	1	0	0	1	1	0	1	0	0	0
<b>Metazoa Comments</b>												
	some rotifer	some rotifer	some rotifer	few rotifers	some rotifers	some rotifers	few rotifers	few rotifers	many rotifers	some rotifers	some rotifers	few rotifers

Microscopy was discontinued as no differences were seen in the first nine cycles.

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